MEDICAL COMMUNICATIONS

OF THE

MASSACHUSETTS MEDICAL SOCIETY.

WITH AN APPENDIX,

CONTAINING THE PROCEEDINGS OF THE COUNCILLORS AND OF THE SOCIETY.

VOLUME XIV.

SECOND SERIES—VOLUME X.

IN THREE PARTS.

BOSTON:
PRINTED FOR THE SOCIETY.
PRESS OF DAVID CLAPP & SON.
1889.

CONTENTS.

ART.		PAGE
I.	—Annual Discourse for 1887.—"The Position of the Massachusetts Medical Society; Its Relations to Medical Progress, to the Community in which we Practise, and to its Fellows." By GEORGE J. TOWNSEND, M.D., of Natick	7
II.	—"The Importance of Early Recognition, Diagnosis and Surgical Treatment of Tumors of the Bladder." By GEORGE W. DAVIS, M.D., of Holyoke	41
III.	—"Laparotomy for Pus in the Abdominal Cavity, and for Peritonitis." By JOHN C. IRISH, M.D., of Lowell	53
IV.	—"The Relation of Tea Drinking to Disorders of of the Nervous System." By WILLIAM N. BULLARD, M.D., of Boston	69
V.	—"The Training of Nurses in Private Practice." By ALFRED WORCESTER, M.D., of Waltham	89
VI.	—"Sepsis and Antisepsis in Summer Diarrhœa." By S. ALLEN POTTER, M.D., of Roxbury	101
VII.	—"A Contribution to the Study of the Etiology of the Summer Diarrhœa of Infants." By HENRY C. HAVEN, M.D., of Boston	113
VIII.	—"Observations on the Puerperal Pelvic Ligaments." By STEPHEN W. DRIVER, M.D., of Cambridge	127
IX.	—"Fracture of the Spine: its Immediate Treatment by Rectification of the Deformity and Fixation by Plaster of Paris Jacket." By HERBERT L. BURRELL, M.D., of Boston	151
X.	—Annual Discourse for 1888.—"Re-Establishment of the Medical Profession." By B. JOY JEFFRIES, M.D., of Boston	179

ART. PAGE

XI.—"Therapeutic Nihilism." By MAURICE D. CLARKE, M.D., of Haverhill 219

XII.—"Uterine Displacements and their Influence on the General Nervous System." By FRANCIS H. DAVENPORT, M.D., of Boston . . . 229

XIII.—"A Study of Phthisis and Pneumonia in Massachusetts; Statistical and Climatological." By W. EVERETT SMITH, M.D., of Boston . . 245

XIV.—"Observations on the Surgical Treatment of Malignant Growths." By MAURICE H. RICHARDSON, M.D., of Boston . . . 273

XV.—"The Value of Corrosive Sublimate as a Practical Disinfectant." By WILLIAM B. HILLS, M.D., of Cambridge 303

XVI.—Annual Discourse for 1889.—"State and Preventive Medicine in Massachusetts." By HENRY P. WALCOTT, M.D., of Cambridge . 317

XVII.—"Modern Methods in Teaching Clinical Obstetrics." By EDWARD REYNOLDS, M.D., of Boston 379

XVIII.—"Escharotics in the Treatment of Malignant Disease." By JOHN C. MUNRO, M.D., of Boston 401

XIX.—"On Pain in the Small of the Back and Thighs." By JOHN A. JEFFRIES, M.D., of Boston . . 415

XX.—"The Non-Radical Treatment of Cancer of the Uterus and Vagina." By HENRY C. BALDWIN, M.D., of Boston 431

XXI.—"Aseptic Obstetrics." By WILLIAM E. BOARDMAN, M.D., of Boston 443

XXII.—"The Surgical Treatment of Backward Displacements of the Uterus." By CHARLES P. STRONG, M.D., of Boston 471

XXIII.—"Antipyretics." By EDWARD N. WHITTIER, M.D., of Boston 493

XXIV.—"A Study of Malarial Fever in Eastern Massachusetts." By CHARLES H. COOK, M.D., of Natick 527

XXV.—"Aseptic Surgery." By HERBERT L. BURRELL, M.D., and GREENLEAF R. TUCKER, S.B., of Boston 551

ARTICLE I.

THE ANNUAL DISCOURSE.

THE POSITION OF THE MASSACHUSETTS MEDICAL SOCIETY;

ITS RELATIONS TO MEDICAL PROGRESS, TO THE COMMUNITY IN WHICH WE PRACTISE, AND TO ITS FELLOWS.

BY GEORGE J. TOWNSEND, M.D.,

OF SOUTH NATICK.

DELIVERED JUNE 8, 1887.

THE POSITION OF THE
MASSACHUSETTS MEDICAL SOCIETY;

ITS RELATIONS TO MEDICAL PROGRESS, TO THE COMMUNITY IN WHICH WE PRACTISE, AND TO ITS FELLOWS.

MR. PRESIDENT AND FELLOWS
OF THE MASSACHUSETTS MEDICAL SOCIETY:

AFTER nearly four decades of active professional life, a personal experience, embracing the first promulgation of the fact that there are diseases self-limited, culminating in the triumphs of antisepsis, retrospection leads us to consider what part we have played in all this, and suggests the topic to which I would invite your attention to-day.

We are accustomed to various opprobrious epithets: We are Allopaths, Old School, Regulars, banded together for our own selfish gain and aggrandizement.

In the recent attempt to change the organization of one of our best appointed hospitals, an eminent lawyer, who should have known better, asks our

---

NOTE.—At an Adjourned Meeting of the Mass. Medical Society, held Oct. 3, 1860, it was

Resolved, "That the Massachusetts Medical Society hereby declares that it does not consider itself as having endorsed or censured the opinions in former published Annual Discourses, nor will it hold itself responsible for any opinions or sentiments advanced in any future similar discourses."

Resolved, "That the Committee on Publication be directed to print a statement to that effect at the commencement of each Annual Discourse which may hereafter be published."

late much-lamented President "if he would not adopt a system of medicine which would cure fifty per cent. more patients than his own"?—a question containing two manifest absurdities, and which necessarily could elicit no answer.

The distinguished divine who graced our last annual dinner with his presence counselled us charity towards other sects in medicine, and that we should not consider it impossible for a patient to be cured by any other system than our own, as if there could be sects and systems in medicine, as there are in theology.

It would seem as if the time had come for an earnest protest against such misrepresentation, such manifestations of utter ignorance of the true scope and workings of our Society.

Our Charter, in the crude fashion of its time, sets forth the objects for which we are incorporated. In its preamble, it takes for granted that the preservation or recovery of health is essentially necessary to the happiness of society, that it "is closely connected with the knowledge of the animal economy, and of the properties and effects of medicines, and that the benefit of medical institutions formed on liberal principles, and encouraged by the patronage of the law, is universally acknowledged."

A careful examination of the articles of our incorporation shows that they are only adapted to the carrying out of the objects set forth in the preamble. There is nothing in them, nor in the by-laws enacted under them, which indicates any

intention to confer exclusive privileges upon our Fellows, unless, possibly, exemption from enrolment in the militia may be considered such a privilege. Yet many of our Fellows render good service as medical officers of our various military organizations, to say nothing of our Society's record during the Secession War.

Have we, as a body, carried out the objects of our Charter? I can only say, "circumspice." There is hardly a general charity in our State that does not number among its workers one or more Fellows of our Society. The strictly medical charities are largely administered by them. Our dispensaries are officered by our younger Fellows, who, fresh from their earnest student work, devote themselves with a zeal which often imperils health, and even life, to the treatment of the squalid poor. What is their compensation? A stipend that would not pay their office-rent, and the experience they gain; and that experience is of doubtful value to the general practitioner, so different are the conditions under which disease manifests itself in those whose surroundings defy all hygienic influences, and in those who enjoy the comforts and luxuries of life.

The staff of our hospitals is composed of men who have already acquired a position for themselves in the community, many of them known to fame, with world-wide reputations. They give hours, days, months of hard work, without money and without price, their only recompense the satisfaction of relieving suffering, and of advancing medical science.

Our teachers labor faithfully and earnestly in our schools, that they may fit others to succeed them in the work they do so well themselves. Their reward is a pittance that a first-class book-keeper would scorn.

But the medical charities of our cities are evident enough, and need not be enlarged upon. What shall be said of the unobtrusive, unknown charitable work done by our Fellows in the lanes and by-ways of our Commonwealth? Some of our inland towns employ a physician by the year, at a stipend of from fifty to one hundred dollars, to attend the town poor. But a large extent of country is entirely unprovided for, with no dispensary or hospital refuge within reach. Our country physicians, then, devote much time and hard work to the relief of the suffering poor. They take long rides to most inaccessible places, enduring summer heats, and literally breasting winter snows, without the hope of fee or reward; with no other motive than to alleviate human suffering. In times of distress, in strait of money, in the prevalence of unusual epidemics, these charities amount to a very large proportion — in instances, to not less than a fifth of the physician's yearly work. Surely, such facts as these should protect us from the imputation of selfishness and greed of gain.

In what sense are we regulars? This is an unfortunate term, its converse occurring in our by-laws, as conveying to the minds of the community the idea that the Massachusetts Medical Society enjoins upon its Fellows a definite course or sys-

tem of pathology and practice, deviation from which constitutes irregularity; than which nothing can be more erroneous. The term, in its application, is, indeed, rather negative than positive. We are regular just so far as we conform to our by-laws, to which we have all given our written assent, and we are irregular when we violate those by-laws, and are guilty of practices forbidden to Fellows. Those practices are, in brief, the professing to cure diseases by any exclusive system of medicine, the advertising, or offering for sale, of secret medicines, and the pretending to cure diseases by such secret medicines, or by any secret treatment.

Are we "Old School," "Allopaths," convertible terms, as usually accepted by the public? We belong to no school whatsoever, certainly, in view of the developments in medicine within the last half-century, not to an old school. As to Allopathy, what the term may mean I am sure I do not know; but if, as defined in Dunglison, it means "a method of curing disease by remedies, the action of which, in healthy man, produces morbid phenomena different from those that are observed in the sick person," very few Fellows of our Society would attempt such a feat as all that implies.

This suggests a proposition which underlies the very foundation of our Society, which has already been publicly proclaimed by one of our Fellows, but which cannot be too often reiterated, or too strongly emphasized, which is, that there is not, never has been, never can be, any exclusive system

of pathology and medicine which can formulate and apply to the modification of disease, as it occurs in its infinite variety of conditions in the human system, all the facts that natural science, pathological research, and clinical observation are every day developing and adding to our store; that whoever attempts to establish such a system begs the question, assumes that the evidence is all in, and that no new fact can be discovered which may militate against his theory. From this, as a corollary, it follows that no exclusive system of pathology and medicine, no "pathy," whatever prefix you give it, can as yet be admitted as either proven or true, nor can it ever be, until medical science is a finality, about which nothing new is to be learned.

Is not this, then, the position of the Massachusetts Medical Society to-day, as at its inception? Seeking only the advancement of medical science, it grants the largest liberty in therapeutics, leaves to the judgment of the attending physician the treatment of every given case, forbidding only pretensions not founded on established facts and exacting only fealty to our Constitution and to our By-laws. These the Society has established as the best means of furthering its objects, the promotion of the health, in consequence the happiness of the community.

A glance, suggestive only in its scope, at some of the more prominent improvements in medicine, in which our Fellows have taken an active part, will best illustrate the relations of our Society to medical progress.

First, on this continent at least, an ever revered Fellow of our Society, our Preceptor, President, promulgated the fact, that there are diseases self-limited, running their course unabridged, though not unmodified by medical treatment. Though the pendulum swung to the opposite extreme, and in view of later developments, expectancy was carried too far in the treatment of those diseases, rarely has a greater boon been conferred upon suffering humanity, than by the assertion of the fact, that medicine will not cut them short.

How great a change this assertion wrought in treatment is rather amusingly illustrated by experience in one of those diseases, notably, typhoid fever. Going fresh from the teachings and practice of the senior physician of the Massachusetts General Hospital, whose principal medication in this disease was twenty drops of the spirits of nitrous ether, once in four hours, to country practice, we were early confronted by the opposite methods of an experienced and much respected professional neighbor. His treatment of the same disease consisted in the exhibition of fourteen emetics in daily succession, each one, as was triumphantly asserted, bringing up bile, and yet, strange to say, his patient lived.

During our student days the only prerequisites for an examination for a degree in medicine, were, that we should bring a certificate of a three years' course of study with some reputable physician and of attendance upon two courses of lectures in a college. The examination was oral, a written the-

sis only being required. Some of our physicians devoted themselves to the teaching of students in the interval between the lectures, but there was no organized effort to an association for that purpose until about the year 1840, when two of our then progressive young men met on Winter Street. The one proposed to the other to form a school for the instruction of students during a summer term. The proposition was readily accepted, and the subject being broached to two more of our Fellows, they at once enlisted in the work, and the result was the formation of the Tremont Medical School. Of these gentlemen three ably filled chairs in the Harvard Medical School, while the fourth was one of the founders of our most valuable special charitable institution and a much beloved and respected physician. This school soon outgrew its original proportions and culminated in the present admirable and ever improving curriculum of Harvard Medical College.

Soon came the discovery of ether. Without going into the question of priority in discovery, many of us may yet remember when Morton first publicly demonstrated that insensibility during a grave and delicate operation could be safely produced. This operation was performed by the senior surgeon of the Massachusetts General Hospital himself, an illustrious pillar of our Society, whose far-reaching sagacity comprehended at once the vast results foreshadowed by this first experience.

We are familiar now with its powers, rendering operations feasible which would be impossible

without it, assuaging pain of every variety, and if not removing woman's primal curse, so far alleviating it, that rigid believers in ancient theology have even objected to its use in their own hour of tribulation, for that cause alone.

Yet those of us who can remember the cries and moans of surgical sufferers, their pains blunted only by full opiates in cases suitable, as the only anæsthetic available, can best realize what Fellows of our Society have done for humanity, by testing the powers and promoting the use of ether.

Though chloroform was soon after discovered, and our transatlantic brethren, ever jealous of Yankee inventions, vaunted its superiority over ether, its lethal qualities, unaverted by every precaution, soon rendered its use of questionable advantage.

In ophthalmic surgery, its last stronghold, it was attacked by a Fellow of our Society, who demonstrated to the British oculist, that ether was as speedy in action, with proper precaution rarely produced vomiting, rendered the eye as quiescent as did chloroform, with a freedom from danger as complete as is possible in using so powerful an agent.

In preventive medicine, a Fellow of our Society, ever earnest in every benevolent work, after persistent and laborious efforts, induced our State to take the lead in establishing a Board of Health, having demonstrated the vast importance as well as feasibility of removing the causes of disease. Though afterward political chicanery and coward-

ice destroyed its usefulness for a time, and merged it in a triple monster as impracticable as it was unwieldy, he has happily lived to see it restored to its pristine simplicity and effectiveness. His name should be blessed throughout the community for his efforts to induce a study of the causes of disease, and to impress upon the public the importance of avoiding them.

In surgical progress a few instances will suffice to indicate what our Society has accomplished.

One of our most illustrious Fellows, distinguished alike for his teaching and achievements in surgery, first threw new light upon injuries of the hip-joint, of inestimable value, especially to the general practitioner, who is not particularly versed in surgery.

Previous to his writings, dislocations of the head of the femur were classified and described clearly enough for diagnosis, and the difficulties in reducing them were well recognized. Our only means for attaining that end was the employment of force, hardly inferior to that which caused the injury. Various appliances had been devised for that purpose, which may well be characterized as the triumph of matter over mind.

It was reserved for him to discover the nature and cause of the obstruction to reduction, and in overcoming it, to substitute intelligent manipulation for brute force.

In impacted fractures of the neck of the femur, which had proved to be amongst the most obscure and intractable injuries, the teachings of the same

author, summed up in a paper only too brief, have initiated a new era in diagnosis and treatment. The days of false joints and incurable lameness, with a possible suit-at-law for damages, are passed. The sufferer is now restored to usefulness and comfort by treatment epitomized in the one word, immobility, provided only that be sufficiently prolonged, while the necessary deformity resulting from the injury is practically slight.

The same author inaugurated a new era in vesical surgery, perhaps his crowning achievement. Previous to his researches, the only means of removing a vesical calculus was a dangerous and critical operation which the most experienced surgeon rarely approached without trepidation. Lithotrity was accepted as hardly less dangerous, and as applicable to but few cases.

The converse now obtains. Our transatlantic brethren, while grudgingly acknowledging priority of suggestion, have made what might almost be termed frantic efforts to improve instruments and methods of operating. But rapid lithotrity, as originated and perfected by one Fellow of our Society, and frequently and successfully performed by his coadjutors in surgery, stands to-day as one of the most important surgical improvements of our time. Without the possibility of a doubt, the sufferer from vesical calculus owes to a Fellow of our Society the discovery and promulgation of the best and safest means for his relief.

In special medicine, the record of our Society has been one of continued and effective progress.

In ophthalmology, especially, much has been done to preserve the integrity and usefulness of an organ, the loss of which renders life a burden.

Some thirty years ago, the treatment of one of the most painful, and to vision, dangerous diseases of the eye, was, to say the least, as heroic as it was unsatisfactory. About that time, our senior oculist, whose work and writings have made his name a household word throughout our land, first demonstrated that iritis was amenable to treatment as effective as it is simple, and since that time the disease has lost much of its terrors. It is now daily treated by the general practitioner, to the great comfort of the patient, and with little danger of impairment of vision.

The same author has also demonstrated that another formidable disease of the eye, especially dangerous in infancy, can be effectively arrested without the use of severe measures. Though his methods may be considered as still *sub judice*, and able oculists maintain the greater safety of the more severe treatment, the fact obtains that patients constantly recover from purulent ophthalmia by the systematic and careful use of mild astringents, combined with the most exact attention to cleanliness.

The efforts of another of our oculists, the son of a pioneer in ophthalmology, and one of the founders of the Eye and Ear Infirmary, to disseminate in the community a knowledge of the frequency and danger of color-blindness, should not be ignored. Though this infirmity, until lately but

little known, may not be proven as a common cause of the fearful accidents by land and by sea, with which our papers daily teem, its probability as a misleading agent cannot be too strongly maintained.

In dermatology, our specialists have done much valuable work, the good results of which are by no means confined to their own practice. The general practitioner is now, by their researches, enabled to treat intelligently diseases of the skin which, not long since, were a source of perplexity, while want of success in their treatment, so easily recognized by the sufferers, constituted the opprobrium of the attending physician.

One of the most common of those diseases in general practice, eczema, has been demonstrated to be amenable to the persistent use of gentle remedies. Patients are no longer indiscriminately saturated with arsenic, nor scoured with drastic soaps; and though cases are constantly met with discouraging enough from their persistency, it is rarely necessary for the general practitioner to consign them to the specialists.

In other specialties, in laryngology, in otology, and the rest, similar progress has been made, and it may literally be said, in many an instance, that the blind see, the deaf hear, the dumb speak, in consequence of the faithful labors of our specialists.

In obstetrics, the progress which has been made is well marked, and the change in method, in many respects, is well-nigh radical.

In our student days, we were counselled never to carry a pair of forceps with us to a case of labor; in fact, it was considered better that we should not even own a pair. This was to discourage what is called meddlesome midwifery, as objectionable now, as it ever could have been. Yet those of us who have been called, as a last resort, to a patient worn out by days and nights of fruitless effort, and, after a successful delivery with forceps, have seen her succumb, plainly from exhausted vitality, can best realize the danger of a do-nothing policy.

Indiscriminate haste in interference with nature's processes is fraught with evil consequences, often entailing permanent disabilities, while too long delay in affording necessary aid is fatal in its effects.

The happy medium is now inculcated by our teachers, and ably carried out by our Fellows, so that we may reasonably hope that mothers undergo their severest ordeal with a minimum of danger and suffering.

Continued efforts are still made to perfect instruments; but however desirable it may be to have a pair of forceps perfectly adapted to their ends, we should not be allowed to lose sight of the fact that it is of much greater importance that the hand which uses them should be guided by a calm, dispassionate brain, and should be practised and skilled for its work.

In a well-directed effort to avert the necessity of a resort to the most repulsive operation in difficult

labor, craniotomy, one of our most progressive teachers has most persistently and ably advocated version where forceps have failed. This is a procedure dangerous enough to mother and child, and not lightly to be adopted. Yet it is demonstrable that it often will succeed in safely delivering the mother and saving the life of the child. Should it fail, the dread alternative is still practicable.

In no disease has there greater progress been made, in pathology and treatment, than in that most dread complication of the parturient state, puerperal, now known as septic fever. Less than fifty years ago this disease was accepted as an idiopathic fever, essentially consisting in peritoneal inflammation and not necessarily contagious. The treatment which we were taught in our student days, corresponded with this pathological view, copious blood-letting being the first requisite, the sheet anchor.

Very soon the occurrence of frequent consecutive cases in the practice of one physician after another, attracted attention, and an invaluable paper maintaining its contagiousness was published by a Fellow of this Society; who amongst the flattering homage of the whole literary world, has his crowning glory from our standpoint, in his well-earned reputation as the "faithful teacher." This paper is believed to be the first conclusive argument which had then been published proving the fact, that the disease could be, and had been carried from one patient to another by the attending

physician. After its perusal, no one could go from a case of puerperal fever, to attend a case of labor, without an inward consciousness, at least, of criminal carelessness.

It was reserved for more recent investigations, to show upon what this contagion depends, and how the hand which is used to comfort and assist becomes the vehicle of death.

Whether or no the germ origin of disease be yet accepted in its entirety, the results obtained by the systematic and rigid application of antisepsis before, during, and after labor, in abridging the frequency of the disease and diminishing its fatality, are simply astounding, and though in the present state of our knowledge we may not hope to see it entirely stamped out, the fact that we can render its occurrence infrequent and that we can abridge its mortality by means within the reach of every practitioner, will enable us all to breathe a sigh of relief.

The convincing, incontrovertible paper prepared with most exhaustive care, the result of most exact observations, just published by the senior attendant of our "Lying-in Hospital," a paper which it would be well were it emblazoned in letters of gold and sowed broadcast throughout the ranks of our profession, leaves no longer room for doubt that the disease is the result of septic infection, introduced from without, that germicidal precautions and treatment will prevent its introduction and will modify its consequences when it has occurred.

In the outlying districts of our Society puerperal septicæmia is a rare disease The seed to be developed must fall upon good ground. The more robust frames, the purer air, the simpler habits of life obtaining in those districts are all important factors conducing to this end. But when it does occur, there is nothing in the whole category of disease more appalling, as all of us can realize, who, after leaving a newly-made mother, safely conducted through her dreaded ordeal, happy in the joys of maternity, have been hastily summoned to her bedside, by the onset of that dread rigor, too often the precursor of the final chill of death.

It is now but little more than twenty years since antisepsis was first suggested, and it was at once readily adopted, more especially by our surgeons, its methods carefully studied, its details minutely described and faithfully carried out. An able and earnest plea for its general reception has been made from this platform. Its wonderful results speak for themselves, limiting contagious disease to the individual, in which it arises, arresting the progress of epidemics, and rendering practicable, operations in surgery, previously regarded as formidable, as they were unsatisfactory in their termination.

In abdominal surgery its value is most readily noticeable. Witness the long list of ovariotomies, without a failure, in the practice of our most distinguished specialist, with a host of other triumphs in general, as well as in abdominal surgery.

There has been a difference of opinion as to the manner in which it acts in preventing disease, and it has been maintained by many that it is essentially only that cleanliness which is akin to godliness. Yet in view of recent developments, antisepsis is generally recognized as, not only the prevention of the presence of germs in abraded surfaces, but also the employment of germicides to render them inert should they escape our vigilance.

Its use is now by no means confined to our cities; though the denser the population, the more necessary it is to guard against the communication of disease. In the remotest regions it is now habitually employed, and the country physician's satchel is rarely found without a supply of the bichloride, a box of antiseptic unguent, and a nail-brush.

The exclusive use of germicides, in the treatment of all diseases, and its triumphant success in arresting morbid processes, is probably a therapeutic Millennium we may never see. For granting that every disease has its specific bacillus, the killing of which will arrest the disease, a germicidal agent powerful enough, for that end, would be equally destructive to the organism in which the germ occurs. Yet a growing tendency to the employment of germicidal therapeutics is already noticeable, and the apparent results obtained promise a radical improvement in the treatment of many, especially the zymotic diseases.

We have admitted woman to fellowship in our Society.

Fully realizing the force of the objections urged against this, by many of our most experienced and able Fellows, not believing now, that numerically, she will ever become a large factor in the practice of medicine, we were early confronted with the fact that we had amongst us, conscientious, educated, competent, female practitioners, and that they had become such without abating one jot or one tittle of those characteristic, inherent, feminine qualities, which constitute woman's priceless jewels. In the most dignified manner, with the utmost propriety, she asked permission to appear before our censors for examination, that, if found qualified, she might be admitted to our Society, shrinking from no ordeal, however severe, that they might deem necessary to prove her acquirements.

It would seem then that we owed it to our manhood, to our simple sense of justice, to grant her request, and by setting the seal of the Society's approval upon the successful candidates, to enable the public to discriminate between them and a host of others, amongst whom may be those who are uneducated, unscrupulous, not to say profligate.

There are certain positions which a competent female practitioner, who is also a true woman, is peculiarly adapted to fill and in which her power for good is necessarily greater than that of any man can be. As an evidence of this fact, the good work of the late physician, and afterward superintendent of our Female Reformatory Prison, is especially prominent. Her fostering care of the

unfortunates committed to her charge, and her humanizing influence upon them cannot be overestimated, and we have every reason to believe that the good seed so faithfully sown will bring forth lasting fruits, fraught with good results to the whole community. But for an accidental circumstance she would probably have become the first female Fellow of our Society, and though now transferred to another more congenial and not less useful sphere, we can but regret her loss to our State.

For similar reasons there is another position, which a competent female practitioner is peculiarly adapted to fill, that is, the medical supervision of the female wards of insane asylums, where a large proportion of the cases, as large as one-tenth, if I am rightly informed, are erotic in their type, rendering the very presence of the opposite sex objectionable. The experiment has certainly been tried with success in a neighboring city.

Our good State enjoys the unenviable distinction of being the paradise of empirics. Aroused by the lamentable consequences of malpractice, resulting in one not very remote instance in the death of the victim, and a verdict of manslaughter against his slayer, our Society appointed a committee to procure legislation regulating the practice of medicine. Mainly through the efforts of its indefatigable Secretary a bill for that end was framed and introduced into the Legislature, there to be killed by the strenuous efforts of its interested antagonists, aided by able counsel, and well supplied with

the sinews of war. This is, perhaps well after all; for though our State is in a small minority, some twenty-six of our neighbors having enacted such a statute, and individuals must still suffer from maltreatment, the true method of overcoming empiricism is by demonstrating to the public that only treatment by an educated skilled physician can produce the result most to be desired, the speediest possible restoration to health and usefulness. But by making this move we have at least shown our unselfish desire to promote the welfare of suffering humanity. For, had the bill become a law, in no possible sense could we personally have been benefited by it, as not seldom our most profitable practice is in undoing the mischief which empirics have caused.

Brethren, the object of this superficial, imperfect sketch, for the half has not been told, is not mutual felicitation. We have sought only to adduce evidence enough to show beyond the possibility of doubt, that, while many of our master minds have originated improvements which constitute eras in medicine and surgery, the Fellows of our Society in general, each one according to his opportunity, have ever been found in the most advanced ranks of medical progress, abreast of its foremost wave.

The relations of our Society to the community in which we practise constitute a subject much misunderstood, yet of vital importance to our patients as well as of interest to ourselves. We have pledged ourselves to unselfishly give them the

benefit of the latest researches, the most advanced thought in medical science, considering their welfare of the first, our own interests of secondary importance. We ask of them in return such reasonable compensation as may enable us to gain our daily bread, and we waive even that in a host of cases where necessity and destitution may require it. This gratuitous practice necessitates more or less self-sacrifice, for though some of our Fellows are blessed with an abundance of this world's goods, if our professional income were divided up there would barely be enough to go round. And while this fact obtains, many an unblushing empiric acquires a large fortune. For as one of our eminent teachers once said to me, "that physician is a fool who, if he has no principle, cannot make money."

The tendency of many patients to frequently change from one physician to another is one great obstacle to the systematic and effectual treatment of their cases; an obstacle of more moment to the sufferer than to his physician. For though it is by no means flattering to our self esteem, after we have carried a case through its gravest phases, to have it suddenly taken from us and placed in the hands of some pretentious pathist, who readily asserts that the patient would have saved much time and suffering if he had only been called sooner, in the long run more patients will come to us under similar circumstances than will leave us.

We value our regular families who for one or two generations perhaps always depend upon us

for aid in their hour of need, not because we are sure of their patronage and for the liberal fees which await us, when our services are rendered and our attendance ceases; not because of the friendships which, however much the idea may have been deprecated in some quarters, will spring up and abide between physician and patient; but because, familiar with their surroundings, their habits of life, their idiosyncrasies, we can render them more intelligent and efficient assistance. No physician, however familiar from long practice with the treatment of disease, can afford to lose sight of the weight of responsibility that rests upon him in the management of every grave case in which the issue of life or death depends upon his fidelity, judgment and ability. Any circumstance that will lighten that burden and make the successful issue more sure is of vast importance and is eagerly sought for by us all.

The causes of this tendency in the community are various. Success being naturally the touchstone by which a physician's ability is tried, the occurrence of one fatal case after another, in spite of his most able and earnest efforts, often drives relatives to seek any change which promises better results, forgetful of the fact that one such disease awaits us all, no human power availing to ward it off.

Impatience of suffering and delay, a constant search after something new — the characteristic of our nation—misleading statistics, loud pretentions of superior methods, of new means, natural and

supernatural, all are factors tending to this result, only to be combatted by a diffusion of the knowledge of the true powers and scope of medicine. There is one cause over which we have some control, and the influence of which we can diminish, and that is the too flippant use of the word *cure*—a word which, in its sense of restoration to health, it would be well were it eliminated from medical phraseology, and the fact stated that no patient was ever yet cured of any disease or disability by any medication or surgical operation. Medicine arrests pathological changes, abates symptoms, relieves suffering. Surgery removes foreign growths, adjusts displaced and fractured members, and, after all, in many instances, the patient fails to get well. Take any familiar disease, for instance, say diphtheria: many at first unpromising cases recover, while another case, in which the disease seems to have been overcome, the membrane disappearing and the appetite returning, fails to do well, and finally succumbs.

So in ovariotomy, a most unpromising case, with extensive adhesions and other grave complications, gets well, while another, in which everything seems favorable for a successful operation, dies.

This, eliminating that general depressing effect of disease and operations, which is termed shock, is from a deficiency of a certain unknown quantity, which we have but limited means of estimating, and over which we have but little control, and which we call constitution, vitality. Whether this

be a distinct principle, implanted in the economy with the breath of life, and growing with its growth, or the aggregate of the inherent forces of organized matter, as has been ably maintained for and against, within our Society, is of no moment. The final cause is the same: the strength of that principle, the sum of those forces, determines the issue in every case.

The relations of our Society to other physicians in the community seems to constitute a topic which is to be treated very gingerly, and with great caution, for what reason is not apparent, unless, forsooth, because many of them with good social standing have a greater or less following of people intelligent and educated enough in other matters, but lamentably ignorant of the true scope and powers of medicine.

Under our by-laws, we can simply have no professional relations whatsoever with such practitioners, neither in general, in special, nor in hospital practice. In general practice, the language of our by-laws is explicit enough, and it makes no exceptions for special nor for hospital practice. In fact, the attempt of any Fellow of our Society to treat a special organ, while some pathist manages the rest of the system, would be a manifest absurdity. What, for instance, could an oculist do with the specific forms of iritis, while somebody else dealt with the systemic infection?

If, in hospital practice, the wards are kept distinct, there is nothing in our by-laws which forbids our Fellows taking charge of one part of a

hospital, while some other physicians take charge of another part. But if the rules of such a hospital require, at any time, a consultation between the members of the different staffs, medical or surgical, no Fellow of our Society can consent to such a consultation without plainly violating his written assent to our by-laws, and imperilling his affiliation to the Society.

Our by-laws forbid such consultations for good and sufficient reasons, obvious enough to any unbiassed inquirer, as it is impossible that any benefit could accrue from them, either to the patient, to medical science or to the consultants. There can be nothing in common between two physicians, of whom the one, fitted by his experience and studies to cull from the broad domain of medical science all the facts which may throw light upon a given case, bases his diagnosis upon those facts, and shapes his treatment accordingly; while the other, having an exclusive theory to maintain, in all consistency, can only accept such facts as accord with his theory, and must reject or ignore all others.

What benefit could the patient derive from such a consultation? No agreement is possible between the physicians, and neither of them can conscientiously yield his views. The patient has no new light thrown upon his case which his attendant accepts, no new treatment proposed which he can carry out.

Nothing is gained for medical science; for the more a case is discussed from such opposite stand-

points, the wider the difference grows, until the consultants separate with a mutual feeling of dissatisfaction, if not of hostility.

What becomes of our boasted philanthropy when we decline such consultations, and refuse the benefit of our advice to a sufferer? We do not decline to aid any sufferer, as far as our time and strength will allow; but, as the responsibility of life rests upon us, we only ask that we shall meet one who is willing to see the force of our reasoning, and, assenting to it, will faithfully carry out our suggestions.

We have expelled from our Society Fellows who profess to cure diseases by any exclusive method, any pathy, and a howl of indignation at our uncharitableness and illiberality echoed from one end of the State to the other, which was as unreasonable as it was uncalled for: uncalled for, because we have ample and unquestionable authority to manage our own affairs, to establish our own by-laws and enforce obedience to them without outside interference or criticism; unreasonable, because the main point at issue has been either entirely misunderstood or wilfully ignored.

Submission to the will of the majority is the cardinal principle of every organization in a republican government, without which there can be no permanency nor power in it, and our own affords no exception to the rule. We have adopted a certain standard for ourselves; we are incorporated for certain definite purposes; we have established by-laws to enable us to

carry out those purposes; we have provided a way to change those by-laws from time to time as expediency may dictate; we require all Fellows to comply with them, and we allow any Fellow to sever his connection with the Society, at his own will and pleasure, provided only that he has paid his dues and has made a written application, giving his reasons therefor. When a Fellow openly and avowedly violates our by-laws with which he has agreed in writing to comply, and becomes guilty of practices forbidden to Fellows, his conduct, viewed by any standard of honor and probity, is unworthy an honorable physician and Fellow of this Society. It is simply giving the lie to his written promise. For this, because they deliberately violated their written word and sought to weaken and subvert an institution which they had promised to sustain, have Fellows been brought to trial, and when found guilty have been expelled from the Society; and not from any personal nor professional hostility to them. No other course was possible consistent with our self-respect and our regard for the permanency and influence of our Society.

Other physicians, viewing these objects from a different standpoint, have organized societies professing certain methods of treatment and practising more or less consistently, according to those methods. With these we have no concern. We have no right, even if we have the inclination, to criticize them, much less to assert that they are dishonorable or unworthy practitioners. Our professional differences are irreconcilable, but there

need be no personal nor social antagonism between us, any more than between others who hold opposite opinions upon various subjects.

The relation of our Society to its Fellows comprehends our mutual relations to each other. Our first duty, if we wish to promote the integrity and influence of our Society, is to guard well its portals, to see that none but good men and true enter there. The committee, appointed by our councillors, have with much labor prepared an exhaustive list of medical schools, which have given evidence of honest, faithful work in fitting students for our profession, and this list has been accepted by the council. A diploma from one of these schools, or its equivalent, is a pre-requisite to an examination for fellowship required from every candidate. Yet there are Fellows of our Society to-day, by no means necessarily incompetent physicians, nor is the date of their admission remote, who cannot show such a diploma or its equivalent. This is an evidence of laxity in discharging their duty on the part of the censors who passed them, plainly forbidden by our by-laws. Though our Society thus far may have suffered no detriment from this, a continuance of the practice is clearly an injustice to those candidates who have complied with our requirements and opens the door to others in the future who may be anything but desirable Fellows.

Once admitted to our Society we cannot sever the affiliation of any Fellow without preferring charges against him, and giving him a fair trial,

in which he has an opportunity to explain and refute those charges. It is evident that it would not be an easy matter to convict one of a violation of the by-laws of our Society before he had given his assent to them, and it would necessarily appear that the fault should be laid at the door of the censors and not of the candidate.

Until quite recently there has been no attempt to secure anything like uniformity in the examinations by the censors of our different districts, and instances are not wanting where candidates rejected in one district have, after the prescribed time has elapsed, applied in another, with the hope of receiving an easier examination. The recent move by the censors to establish a definite system of examination throughout all our districts, is in the right direction, securing a practical, honest test of his acquirements to the candidate, one which every practitioner ought to be able to pass, and excluding only those who are clearly deficient in education and therefore incompetent.

One more topic I fain would not pass over, albeit a delicate one. Our organization is essentially a brotherhood. We are banded together for the public weal. Harmony and unanimity are necessary to the attainment of our ends. In the active competition of professional life, a competition which with many of us means a struggle for daily bread, collisions may occur, always fostered and enjoyed by outside parties ever ready to cavil at our profession, the evil effects of which are only to be averted by mutual concession and for-

bearance. Sharp criticism, disparaging remarks concerning a brother physician, are often thought to be sweet incense to our ears, whereas a greater insult cannot be offered us or our profession. It is rarely, indeed, the case that we cannot offset such remarks by the mention of some act of unselfish and successful devotion on the part of our abused brother.

We have admitted women to our Society. We all recognize her priceless influence in softening the asperities and promoting the amenities of social life; may we not hope for some of that same influence in our professional relations, so that when we are tauntingly asked, when doctors disagree who shall decide? we may answer, the woman.

Brethren, let us close our ranks, progress shoulder to shoulder, banish all personal animosities, do battle only against the King of Terrors and all his attendant miseries, and, though worsted at last in every encounter, with services often unrequited and even unrecognized, gather consolation in that we have contributed our mite to diminish the sum of human suffering.

Thus may we expect to see our Society acknowledged as the power for good in the community, which it is; commanding the respect which is its due, because founded upon eternal principles of truth and benevolence.

ARTICLE II.

THE IMPORTANCE OF EARLY RECOGNITION, DIAGNOSIS AND SURGICAL TREATMENT OF TUMORS OF THE BLADDER.

By GEORGE W. DAVIS, M.D.
OF HOLYOKE.

READ JUNE 7, 1887.

THE IMPORTANCE OF EARLY RECOGNITION, DIAGNOSIS AND SURGICAL TREATMENT OF TUMORS OF THE BLADDER.

As the methods of examination of the bladder and the means of investigating its diseases are becoming more numerous and exact, results are likewise becoming more positive and certain; diseased states and pathological conditions, formerly not known to exist, are now recognized and understood. With the present rapid development of surgical knowledge, let us hope that attainment to that degree of expertness which shall secure more satisfactory diagnoses and treatment of these obscure conditions is near at hand—conditions most distressing and fatal.

It is quite possible that the bladder is more frequently the seat of tumor than is usually supposed.

Abnormal states of this organ are often surrounded with so much obscurity as to make diagnosis difficult or uncertain, and it is not improbable that tumor is sometimes overlooked.

At the present time the literature of tumors of the bladder seems very scant; but the reports of cases, and of the removal of such growths are becoming more frequent.

During the years 1882 and 1883 papers were presented to the Medico-Chirurgical Society, in London, by Sir Henry Thompson, calling attention to a new procedure for exploring the bladder, which he named digital exploration of the bladder, or external urethrotomy. This consisted of making a central perineal opening into the membranous portion of the urethra, just large enough to admit the index finger,

which being introduced was able to explore the cavity of the bladder and its walls, in very much the same manner, and with nearly the same facility, as in customary examinations of the bladder of the female, through the dilated urethra.

Several cases were cited where the objects of the operation were fully realized, the entire mucous surface of the bladder coming within reach of the exploring finger, so that all the knowledge possible to be attained by the sense of touch was readily secured.

Tumors were in several instances discovered; their size, shape, consistency and location readily ascertained; their degree of hardness, manner of attachment, and much other useful information obtained, rendering the possibility of their removal a question for intelligent consideration.

Other cases were cited where only negative information was obtained, nothing important being found, yet the symptoms were either cured or much relieved.

He also pronounced the exploration almost without danger. The operation being quite simple and easily made, and being presented and advocated by a surgeon of such universal experience and unquestionable authority, appears to have at once taken a place among justifiable surgical procedures.

Opening the membranous urethra had long been done in stricture, retention, etc., but the idea of making such an operation merely to furnish a way into the bladder for diagnostic purposes was new and excited much interest.

It seems that Prof. Volkmann, of Halle, at nearly the same time and independently of Mr. Thompson, made the same exploration, and in Germany it is often designated as the Volkmann-Thompsonian operation.

With the description of his method there was given by Mr. Thompson a list of tumors found and removed, some through the wound of exploration.

The attention of the profession being thus forcibly called to the subject, tumors have come to occupy a more prominent place among the possible or even probable causes of intractable and obscure symptoms referable to the bladder, and so a new field for surgical culture has been opened and a new sphere presented for the relief of cases which have heretofore remained unrecognized and been given over as incurable.

It would seem, however, that Thompson's exploratory incision has not met with much favor in France or Germany, the supra-pubic or *sectio alta* being almost always preferred by continental surgeons. Enlarged prostate and great obesity are conditions which interfere with its successful performance.

The bimanual examination of the bladder, sometimes mentioned in connection with the name of Volkmann, is much relied upon by all surgeons, and should never be neglected in any case of doubt. It is made with one or two fingers of one hand in the rectum, the other hand firmly pressing into the pelvis from above the pubes, the weight of an assistant often being necessary to aid in sufficiently forcing the pelvic contents down upon the examining fingers. An anæsthetic is indispensable in this manner of examination, as it is in examination *viâ* the median perineal incision of Thompson. The bladder must be quite empty, and unless there is much obesity a tumor of any considerable size and consistency can hardly escape discovery.

An encysted calculus which has escaped the sound may be thus discovered.

A paper was read by Dr. Max Nitze, of Berlin, at the Berlin Medical Society, Jan. 5, 1887 (reported in the *Berliner Klinische Wochenschrift* of this year, Nos. 8 and 9), in which he gives a careful resumé of the various methods of examination of the bladder, commenting upon the relative advantages of each, but more particularly de-

scribing his own method of exploring the cavity and inner surface of the bladder by the sense of sight.

This is made possible by an ingeniously arranged electric light, so introduced that it may be said to be combined with an endoscope, the inner surface being as distinctly seen as though it were examined piecemeal by the light of day after removal from the body. The bladder is made to contain a certain quantity of transparent fluid, thus opening the folds of the mucous membrane and presenting all portions of the mucous surface to view. The field at once visible is as large as a silver dollar, and is described as much resembling the image of the fundus of the eye when seen with the opthalmoscope.

By changing the position of the mirror in this instrument or kystoscope, as named by Nitze, the entire surface is readily and quickly seen and any abnormal condition easily recognized. By the use of cocaine its use is rendered painless, and no other anæsthetic is necessary. The danger from heat resulting from the lamp in use is overcome by the circulation of a current of cold water.

Nitze cites cases where his method of examination has succeeded in discovering tumors which were removed, and he is confident its more general use would make earlier diagnosis possible, and so save valuable time.

At a meeting of the Medical Society of Berlin, Jan. 19, 1887, Prof. Von Bergmann reported a case of tumor of the bladder, describing its symptoms, diagnosis and removal. In this case Nitze demonstrated to the satisfaction of Von Bergmann the practical working of his instrument, the latter speaking of it in terms of much praise, as being easily introduced and not distending the urethra or neck of the bladder more than a large-sized catheter, and in this case not occasioning any hemorrhage. (See *Berliner Klinische Wochenschrift*, No 6, 1887.)

If we accept the statements of Nitze and Von Bergmann, we shall be forced to believe that most incisions and severe proceedings for purely diagnostic purposes are soon to be laid aside, and the kystoscope is to reveal to the eye of the diagnostician the actual state, the size and shape of stones or tumors being readily seen and appreciated.

The symptoms in tumor of the bladder are such as suggest the presence of stone, stricture, prostatic hypertrophy, or disease of the kidney.

Dysuria and strangury are present in the course of the development of tumor, and are often the occasion of great suffering and anxiety to the patient, their severity depending largely upon the variety and location of the growth, its size, the length of time it has existed, the extent of the irritation and inflammation, the relative acidity of the urine, and many other obvious conditions. Cystitis is sometimes present in such intensity as to mask the symptoms more directly proceeding from tumor.

Hæmaturia is perhaps the most constant symptom in tumor of the bladder, but this may result from other causes which must be excluded. Hemorrhage from the kidney is usually attended with attacks of renal colic and other evidences of renal disease. Stone in the bladder must be excluded, and search with the catheter or sound for stone may discover the tumor, an indefinite something being felt which does not give the positive evidences of stone. The old, long-beaked sound formerly used for exploration of the bladder is now giving place to the short-beaked catheter furnished with stop-cock so that any degree of distention may be secured.

Soft instruments are much relied upon for exploration of the bladder by many surgeons of large experience.

Should clear water recently injected into the empty bladder return tinged with blood, we have evidence that the hemorrhage is vesical. Fresh blood passing at the end

of, or immediately after micturition, must come from the bladder or urethra. The possibility of diseased prostate is suggested by this symptom. Much hemorrhage will suggest the presence of a vascular growth, and the bleeding may be out of all proportion to the size of the tumor, death having resulted from the loss of blood from a tumor of the villous variety, scarcely larger than a pea. (See Coulson, page 115.)

Cases may be attended with attacks of more or less profuse hemorrhage, separated by intervals during which the urine is nearly or quite clear of blood, but often the hemorrhage is continuous and never profuse, slowly exhausting the patient.

Shreds of tissue or tufts of the villous growth may be discharged with the urine or caught in the eye of the catheter, and if examined with the microscope may make the diagnosis certain as to the presence of tumor, and the question of its malignancy may be thus decided. Malignant growths are more rapid in their progress, and the urine may contain evidence of their presence in the form of débris.

Continuous hemorrhage not relieved by treatment or rest and the recumbent position, is strongly suggestive of the presence of a neoplasm, either in the bladder or kidney.

M. Guyon, of Paris, calls attention to the frequent presence of varicocele in tumor of the kidney, and also insists upon search for evidence of increased mobility of this organ, which he states is present to such an extent as to be readily recognized by bimanual examination or palpation, balottment being perceptible, even in the early stages of such neoplastic formations.

This sign is produced by placing one hand in front of the hypochondrium and exerting with the other slight and quick movements or shocks in the lumbar region, this manœuvre sufficing to recognize the mobility of the kidney.

Direct examination of the kidney, however, is acknowledged to be often very difficult, even by Guyon, who claims that in the great majority of cases the diagnosis of bladder tumors can be established without operation, and relies largely upon the presence of hæmaturia as a symptom. He also says that when a simple catheterization is followed by a continuous bleeding of long duration, a tumor may be almost positively diagnosed.

The importance of an early diagnosis should be emphasized, for if the growth be *non*-malignant, the probability of its successful removal is much greater if attempted early, before it has attained to large size or occasioned destructive changes and exhausted the strength of the patient by prolonged hemorrhage and suffering. If the symptoms are not yet so distressing as to make removal advisable, only good can result from a knowledge of its presence. In malignant growths of the bladder sufficiently advanced to occasion marked symptoms and admit of diagnosis, there can be little hope of a radical cure by operation, and the question to be decided is, Can an operation alleviate the distressing symptoms, and so become valuable to the patient?

M. Guyon has operated upon thirteen cases of malignant growth of the bladder, and reports that the symptoms determining operation were relieved in all. He states that malignant tumors have scarcely attained to the size of a pea before there is infiltration, and it is already too late to hope for radical cure.

Admitting the truthfulness of M. Guyon's statement, it does not weigh against early operation, as the differentiation between malignant and non-malignant cannot be early determined before operation in most cases.

In the February number of the *Journal de Medecine et de Chirurgie* of Paris, of the present year, was reported a case of epitheliomatous growth removed by M. Guyon, the operation being described as radical. It had not returned

after six months. In this case the growth was as large as the end of the thumb and situated in the anterior superior portion of the bladder, so being favorable for Guyon's operation, which is always supra-pubic.

The allotted length of this paper will not permit a careful discussion of the various questions involved in the treatment of these cases, but I will in a general way briefly refer to certain points.

No medication is likely to arrest the growth of neoplasms of the bladder, but if there is a possibility of syphilis in the case, the remedies known to act as its antidote should not be withheld. The general condition of the patient being cared for, the treatment must be of a local and surgical nature. Such symptoms as are particularly distressing must receive attention and be met by the usual remedies. An attempt must be made to control the hemorrhage by rest and the horizontal position, and by astringent injections, of which, solutions of nitrate of silver and the prochloride of iron, varying in strength from one to three per cent., are most preferred. Antiseptic solutions for douching the bladder will be found indispensable.

The question of removal will be ever before the mind of the surgeon fully determined upon giving the patient every opportunity for relief. The cases of successful removal are now sufficiently numerous to make it no longer a question of doubt as to the duty of the surgeon in any urgent case presenting no marked contra-indications to operation. The usual tendency of this condition being to get worse, and after long months or years of increasing suffering to finally terminate fatally, the surgeon is, in duty to the patient, bound to explore the bladder in such a manner as shall enable him to act intelligently.

If the sound or catheter, with bimanual examination, or the kystoscope of Nitze, or such other methods as may be available, fail to make the condition plain, the bladder

should be explored by the finger, and the question of choice between external urethrotomy and the supra-pubic operation must be decided upon.

If it is probable that much operative procedure will be required, as in the repeated passage of forceps for the removal of several growths, or a single large one, the higher operation should be at first selected, for its performance would be necessary, notwithstanding the urethra had been already opened, and we can hardly agree with Mr. Thompson in the opinion that the two operations do not add to the risks in the case. But if the urethra has been opened and a growth discovered, the thorough removal of which will necessitate too much manipulation to be safely done through the dilated neck of the bladder, the operator's duty will plainly be to make the high operation without delay.

There may be found in the July number of *Braithwaite*, 1886, a description of a sound invented by Mr. Thompson, which serves to support the bladder under these circumstances. The extremity of this sound is so notched that the surgeon can, while coming down upon it from above, recognize its exact position, and seizing with a hook the wall of the empty bladder can maintain its elevated position during the operations within its cavity.

The technique of cystotomy for the removal of tumor is mainly the same as in operation for stone.

Every case must present its own peculiar features. Several pairs of forceps with blades of varying width should be at hand. The margins of the blades should be slightly rounded to avoid the wall of the bladder.

The spoon of Volkmann is the proper instrument for scraping away such portions as cannot be completely removed with the forceps.

The removal of vascular growths is likely to be attended with much hemorrhage, and the operator must be prepared for any emergency arising therefrom.

In the event of the tumor or tumors being very vascular in the female, it may be wise to operate through a vesico-vaginal opening made for the purpose, but the surgeon should be very guarded in promising its speedy closure.

I have recently had the care of a woman who had tumors of the bladder of recurrent nature, which were several times removed by Dr. W. H. Baker, of Boston, through a vesico-vaginal opening. Owing to a continuance of the symptoms and the recurrence of the growths, the fistula was not closed. At the time of my examination, what seemed to be several soft tumors of small size could be felt. At the post-mortem, six weeks later, there was found less of the gross appearances of tumor than I had expected. What had felt to the examining finger like soft tumors, was really a number of collections of villous tufts, very vascular and presenting to the eye, as well as to the finger, a velvety appearance. About one-fourth of the inner surface of the bladder was lined with this neoplastic formation.

Any one examining this specimen must be impressed with the difficulty necessarily attending the entire removal of the growth in a similar case.*

This very intelligent patient derived much relief from hot douches; but she learned by experience that they would, if too persistently used, aggravate the symptoms they were accustomed to relieve.

As will be remarked, no reference has been made to the pathology, and no attempt at a classification of tumors of the bladder—only certain points have been touched upon. Sufficient, however, may have been said to suggest the possibility of tumor to the mind of some one who may be searching for an explanation of certain obscure bladder symptoms.

* The specimen was exhibited to the Society.

ARTICLE III.

LAPAROTOMY FOR PUS IN THE ABDOMINAL CAVITY, AND FOR PERITONITIS.

By JOHN C. IRISH, M.D.
OF LOWELL.

READ JUNE 7, 1887.

LAPAROTOMY FOR PUS IN THE ABDOMINAL CAVITY, AND FOR PERITONITIS.

It is only very recently that cases of septic peritonitis, and of pus free or encysted, within the serous membrane of the abdomen, have been systematically treated by abdominal section and drainage. Within the past three or four years, however, quite a number of such operations have been reported, particularly by those engaged in abdominal surgery. But this number is still so small, and the indications for operative interference so indistinctly defined, as to lead me to hope that a report of additional cases will be interesting.

The consideration of pelvic abscesses might properly come within the scope of this paper, as a portion of them, at least, are intra-peritoneal collections of pus. Many of them, too, have been treated by abdominal section and drainage. A portion of these operations have been, undoubtedly, laparotomies, according to the general acceptation of this term, while in other cases the operation has not differed from the opening of other abscesses that have pointed externally. I shall omit all discussion of pelvic abscesses, with the exception of those rare cases in which the pus has escaped into the cavity of the peritoneum.

To the treatment of retro-peritoneal, peri-typhilitic and other extra-peritoneal abscesses, I wish to call your attention only in the event that they have become intra-peritoneal by escape of pus into the peritoneal cavity—an accident that is far more frequent with these than with the pelvic abscess.

As an introduction to the consideration of my subject, I desire to present, with as little detail as possible, the three following cases. Two of them are illustrations of the circumscribed peritoneal abscess; the third is an example of the irruption of pus, that had formed elsewhere, into the peritoneal cavity.

CASE I.—Under the care of Dr. Lane, of Billerica, to whom I am indebted for the following history: "J. L., a young man; age 19. At the time of my first visit, April 3, 1884, he was suffering from a general condition of fever. Pulse, 100; temperature, 102°; bowels constipated and tender upon pressure. This condition continued about ten days, save a fluctuating temperature. Then the bowels began to enlarge, with increasing tenderness on the left side of abdomen, and with decided dulness on percussion. From this time the pain, tenderness, and fulness of the left side steadily increased. The pulse and temperature varied greatly from day to day, the former ranging from 100 to 130, the latter from 100° to 104°."

May 3d, I saw the patient with Dr. Lane. At this time there was marked prostration from general septic poisoning. The pulse, 120; temperature, 103°. Over the left anterior portion of the abdomen, extending about two inches to the right of the umbilicus, and distending the parietes, could be felt a fluctuating mass, uniformly oval, and dull on percussion. An abdominal incision three inches in length was made, through which escaped about three quarts of an odorless, purulent liquid. An examination through the incision demonstrated the parietal peritoneum, and, with the hand in the pus cavity, there could be felt on the right side, the agglutinated coils of intestine and the fibrinous partition wall that separated the abscess from the remaining portion of the peritoneal cavity. Although neither the previous history of the case nor our examination revealed the cause of the abscess, yet its intra-peritoneal origin was clearly shown.

After the cavity had been thoroughly washed out with a mild antiseptic solution, a drainage tube was inserted, and the usual dressings applied. In a few days the pulse and temperature became normal, and the patient went on uninterruptedly to recovery, which was complete in two months after the operation.

CASE II.—N. P., Lowell, man aged 26. A patient of Dr. Chadbourne. In the latter part of December, 1886, an abscess, not due to any appreciable cause, pointed just below Poupart's ligament on the right. This was opened with the bistoury, and about eight ounces of pus escaped. The pus track extended over the os pubis and deeply within the pelvis. The abscess was evidently extra-peritoneal, and originated somewhere in the pelvic cavity.

Three months later there appeared on the left side a moderate distension of the abdominal walls. Over a well-defined space were dulness and fluctuation, but no tendency at any point to a spontaneous opening of the abscess appeared.

An incision three inches in length and four inches to the left of the median line gave exit to about three pints of a thin offensive pus. The cavity was washed out, a glass drainage tube inserted, and the remainder of the wound closed with sutures.

The patient has made an entire recovery so far as the peritoneal abscess is concerned. From the pelvic abscess a slight discharge of pus still continues along the fistulous track.

In attempting to solve any possible doubt as to the intraperitoneal origin of this second abscess, I explored with my hand the pus cavity, but so profuse a hemorrhage from the partition walls followed my manipulations, that I was obliged to desist.

I concluded, however, that its site was intra-peritoneal, and have so classed it for these reasons: Because the anterior boundary seemed to be the parietal peritoneum,

thickened and covered with a lymph and fibrinous deposit; because the contained fluid had the gross appearances usually found in the encysted purulent effusions of a localized peritonitis; and, because the hemorrhage, that I mentioned, would readily come from intra-peritoneal adhesions, but would not certainly be expected from the walls of an extra-peritoneal abscess.

CASE III.—This patient was under the care of Dr. Trueworthy, of Lowell, who has kindly prepared for me the following report of the case up to the time of operation:

"Mrs. D., of Lowell, age 25. August, 1881, was thrown from a carriage and dragged a considerable distance. After the accident she suffered from great pain and soreness in the lower part of the bowels, and from a menorrhagia that continued about five weeks. Mrs. D. was married in the fall of 1881, but has never been pregnant. In July, 1882, she had an attack of pelvic cellulitis, from which she recovered slowly and imperfectly. From this time her menstruation was irregular and her general health somewhat impaired. April, 1885, she had an attack of perimetritis that continued with varying severity till July 10th, when I saw her for the first time during this illness. The uterus was enlarged and tender on pressure. A solid mass occupied the posterior cul-de-sac. Over the lower portion of the abdomen there was a general feel of fulness. The bowels were slightly distended, and the patient complained of severe pain at the lower part of the abdomen. Temperature, 103°; pulse, rapid. The acuteness and severity of the symptoms to quite an extent subsided during the succeeding few weeks, but the pelvic effusion remained and increased. August 20, Mrs. D. had a chill, followed by a rise of temperature and an increased severity of the general symptoms. Vomiting became frequent, and the swelling in the hypogastric region reached nearly to the umbilicus. Temperature varied, sometimes reaching 104°. The gen-

eral emaciation and debility had increased up to September 7th."

At this date I was called by Dr. Trueworthy to see Mrs. D. on account of an alarming prostration that had suddenly supervened. The extreme pallor, anxious expression, and feeble pulse of our patient indicated plainly enough that some grave accident had befallen her.

Stimulants were freely administered, and an hour later an incision along the median line, four inches in length, was made. A considerable amount of pus, at least one quart, was found among the coils of intestines and in the dependent portions of the peritoneal cavity. This pus had come from the rupture of a pelvic abscess, whose existence the preceding history of the case has so clearly indicated.

The entire cavity was thoroughly washed with large quantities of warm water. A long drainage tube was carried well down behind the uterus, and the rest of the abdominal wound was closed.

During the operation it became necessary to sustain the patient with frequent subcutaneous injections of brandy. She bore the shock badly, and rallied very slowly. She went on, however, without any incident worthy of mention, to a recovery that was complete six months after.

In considering the surgical treatment of those effusions more or less purulent, occasionally encysted, oftener diffuse, that one finds in the abdominal cavity, their origin and mode of occurrence become an important subject of inquiry: First, we find pus within the peritoneum from the rupture of an ovarian cyst, of a pyosalpinx, of a pelvic abscess (as in the case just described), from perityphlitic, hepatic and other extra-peritoneal abscesses, that have discharged their contents in this direction. Second, more frequently circumscribed peritoneal abscesses are found, which, in other words, are localized peritonites with purulent encysted effusions. In a third class of cases we find the pus a product of a diffuse purulent peritonitis.

Therefore, in discussing the treatment appropriate to those cases of pus within the peritoneum, we are compelled to consider also the various forms of peritonitis, since the latter, in the vast majority of instances, stands in a causative relation to the purulent effusion.

By a somewhat hurried search through the recent medical literature within my reach, I have found reported the three following cases, nearly analogous to Case III. of this paper:

CASE I.—Operator, Sonnenburg.[1] A large perimetritic exudation had broken into the abdominal cavity, several weeks after the confinement of the patient. A very acute peritonitis was at once excited. Laparotomy, careful cleansing of the peritoneum, drainage, recovery.

CASE II.—Mr. Treves.[2] Woman, 21 years of age, with a pelvic abscess following gonorrhœa. At the time of operation the abdomen was tense, tympanitic, distended, and painful on pressure. Upon opening the cavity an acute diffuse peritonitis was found. A quantity of semi-opaque fluid, lymph and pus poured out. Pus welled up from the depth of the pelvis. It was found that a pelvic abscess upon the left side had ruptured into the general peritoneal cavity. Drainage was employed. The patient recovered.

CASE III.—Lawson Tait, 1883.[3] The summary of this case I quote from the very exhaustive treatise upon "The Surgical Treatment of Peritonitis," published recently by Dr. H. Truc, of Lyons: "Young woman of twenty years. The existence of peritonitis was not doubtful, and there were also signs of intestinal obstruction. A peritonitis from salpingitis is suspected, for the patient received two years before a violent blow upon the abdomen. Laparotomy; much pus in the peritoneal cavity; pelvic organs agglutinated. No intestinal obstruction. The right fallopian

[1] Arch. Tocol. 1885.
[2] Medico-Chirurg. Trans. London, March 10, 1885.
[3] British Med. Jour. 1883.

tube contained pus and had been ruptured. Cure. At the end of several weeks there exist some morbid symptoms that are difficult to describe precisely." These few cases, only four, are indeed of very little value in estimating the measure of success that will follow the treatment of extra-peritoneal abscesses that have broken into the peritoneum, by laparotomy and drainage. In another way they have a great value, for they indicate, as clearly as a much larger number could do, the only mode of treatment that offers in this condition any promise of success.

When other bodies gain access to the peritoneal cavity, they excite a peritonitis more or less acute, and usually a pus-forming one. The degree of acuteness and purulence is in direct ratio to the septicism of the foreign material. The rupture of bladder, intestines, liver, or other visceral organs by blows, the penetration of them by wounds or missiles, produces a diffuse septic peritonitis.

Perforation of stomach or bowels by ulcerations, as in gastric ulcer, typhoid fever, or dysentery, is followed by peritoneal inflammation very purulent and septic. In obstruction of the bowels from various causes, in which no perforation has taken place, we often find a pus-producing peritonitis.

In quite a large number of these cases, laparotomy has been done for the cure of the existing lesions and only in-indirectly for relief of the peritonitis. Quite a proportion of them have recovered. Thus laparotomy has cured not only the lesion, for which it was made, but the peritonitis as well.

Excluding those cases in which the patient died soon after the surgical interference, the recorded histories show, usually, that the peritoneal inflammation has been entirely relieved or favorably modified by abdominal section and toilet of the peritoneum.

Peritonitis of a very septic character and with rapidly fatal tendency is not infrequently produced by the rupture

or degenerative inflammation of ovarian cyst walls. In 1868, Willshire operated successfully for the removal of a gangrenous cyst that had caused a most formidable peritonitis. A short time before, Keith had also had one of these cases that recovered. And, to-day, I believe it is agreed among ovariotomists that the advent of peritoneal inflammation is a most urgent indication for ovariotomy. A large proportion of the patients in this condition in the hands of Keith, Tait, Homans, and others have recovered. That is, not only the tumor has been removed, but the peritonitis, too, has been cured. I think that no more conclusive proof of the utility of laparotomy for the treatment of peritoneal inflammation could be adduced, than these facts afford.

In localized peritonites with encysted effusions, or, as Mr. Bennett has more happily designated them, encysted peritoneal abscesses, there can to-day be no question as to the propriety of immediately evacuating their purulent contents. The only question can be, in regard to the best mode of doing this. For the purpose of showing the excellent results that have followed the treatment of these abscesses by laparotomy, I avail myself of the statistical researches of Dr. Truc:

He gives, somewhat in detail, the histories of ten cases. One of them is that by Dr. Adams, of Framingham; another by Dr. Wilson, of Maryland. To these I have six to add, as follows:—

One, by Lawson Tait.[1] Abdominal section was made, and three distinct peritoneal abscesses were found. After the operation, the temperature became normal. At the time of writing, the patient had not entirely recovered.

The second, by T. G. Thomas.[2] Laparotomy, drainage, recovery.

[1] Lancet Feb. 20, 1886.
[2] Reported by Buckmaster, Journal Medical Sciences, April, 1887.

The third, by Dr. Watson.[1] A woman, aged 58; supposed to be suffering from an ovarian tumor. Six quarts of pus escaped through the abdominal incision, and the finger passed into a cavity, at the bottom of which the pelvic organs were felt, covered with flocculent lymph; while above, the wall of the abscess formed a complete partition between the cavity and the intestines. A drainage tube was used, and the patient made a good recovery.

The fourth, by Dr. Homans. Case not published. Mrs. S., age 28. In January, 1882, began to suffer from pain and tenderness of the abdomen, and from slight fever and diarrhœa. These symptoms continued till July, when a fluctuating abdominal tumor was found. Percussion note dull anteriorly, resonant in the right flank, less so in the left.

Aug. 3d, 10 lbs. of pus were withdrawn with the trochar. Aug. 9th, an abdominal incision, four inches in length, was made, giving exit to eight pounds of pus. Abscess cavity was washed out and drainage tubes were inserted. The patient recovered in about four weeks after the operation.

The two remaining cases are reported above.

The sixteen cases give these results:—Twelve recoveries, three partial recoveries, and one death.

Peritoneal abscesses, in the past few years, have often been treated by evacuation of their contents with the aspirator. Exceptionally by one or more aspirations a cure has been obtained. Generally, however, the sac refills as often as it is emptied in this way. Several of the above cases were first treated by aspiration, but afterwards it became necessary to make abdominal section and employ irrigations and drainage of the pus cavity.

The lessons, as to the management of encysted peritoneal abscesses, which the histories of these sixteen cases seem to teach, are, that the following treatment is not only appropriate, but that it is almost uniformly successful. The

[1] Glasgow Medical Journal, 1886.

operation should be performed as early as possible, to prevent the progressive loss of strength by the patient and to avert the danger, always present, of a rupture of the abscess walls. An incision, anywhere through the abdominal walls, should be made over the most prominent part of the tumor. This should be done carefully, and all hæmorrhage arrested before the peritoneum is opened. After the purulent liquid has escaped and the pus cavity has been thoroughly irrigated with a mild antiseptic solution, a drainage tube is inserted and the remainder of the abdominal wound closed. I favor this rather free incision, both to facilitate the escape of pus and to allow a thorough examination of the pus cavity, if this should seem desirable. Should such an examination be made with the hand, great care is necessary, for the partition walls of organized lymph bleed very readily and freely.

Acute diffuse peritonitis not due to the escape of pus or other abnormal material into the abdominal cavity, nor to puerperal sepsis, is less frequent than the localized form that has just now engaged our attention. It has, however, great interest for the surgeon, for its natural course is extremely fatal, while surgical interference has shown itself able to save more than one half of these patients.

General acute peritonitis does, undoubtedly, occur in which there is no effusion of liquid. Such instances, I believe, are very rare. Of this subject Dr. Truc says, " Purulent peritonitis is the usual form of acute inflammation of the peritoneal serous membrane " and he further quotes Besnier as saying that an acute inflammation of the peritoneum never produces a transparent serous fluid, and that this rule is without exception. That is, that the effusion, which almost always occurs, is to a greater or less extent purulent.

Therefore in this, as in the preceding classes of cases that we have passed in review, the surgeon has to deal with pus in the abdominal cavity. The results thus far obtained by abdominal section, as stated by Dr. B. F. Curtis, are eight

recoveries (to which may be added one by Dr. Marcy, of Cambridge, and one by Buchanan, of Glasgow) and three deaths. In the latter the operation was performed too late to be of any avail.

Tubercular peritonitis is so widely separated by its cause and course of development from the other forms of peritoneal inflammation that we have considered, as to render it a very distinct affection. Yet as the surgical treatment of it, entered upon sometimes through a mistaken diagnosis, has given some brilliant results, it seems important to refer briefly to a few of these cases and note the existing conditions in which laparotomy has been able to effect a cure or great amelioration. At first thought, recalling the pathology of this affection, it would seem impossible that any surgical interference could be other than disastrous. Still, when we remember that many tuberculous joints have been cured by free incision and drainage, this treatment as applied to the abdominal cavity becomes more reasonable.

Spencer Wells[1] reports two cases. In both there was a large amount of liquid. In the first it was serous, in the second of greater consistency but not pus. The peritoneum was covered with tubercular granulations. Both patients recovered and continued in good health after the operation. Lanois reports a case in which he made an abdominal section. The effusion was purulent. Patient recovered.

Dr. Wylie, of New York, reports two cases cured by laparotomy and drainage. Before this Society in 1885 Dr. Homans gave the history of one in which he made an exploratory incision that was followed by an excellent recovery. Several other successful cases have been recorded.

In all of them there was quite a large effusion of liquid, sometimes serous, oftener sero-purulent. Thus the tubercular form has had one condition in common with the other

[1] Tumors of the Ovaries and Uterus—Wells.

peritonites, namely, liquid in the peritoneal cavity, and this often containing pus elements.

The patients that recovered were in fair general health, and the only local manifestation of the tuberculous diathesis was in connection with the peritoneum.

An article treating of the various classes of pus-forming peritonites and omitting all consideration of the puerperal, the most septic and purulent of all, would be a very incomplete one. But I have already so trespassed upon your time, that I must be content with a brief reference to a single form of puerperal peritonitis. I refer to that which follows abortions either accidental or induced, but which exceptionally is seen after labor at full term. Showing itself at a later period after the parturient act, than is the rule with more acute peritonites, it commences with abdominal pain, increased temperature and pulse rate, all in moderate degree. Tympanites more or less marked is always present. All these symptoms become progressively more severe. Vomiting and diarrhœa supervene, the features gradually acquire a pinched and anxious look, the pulse becomes thready and very rapid, the extremities cold, and the patient dies a few days after the commencement of the attack.

I have made three autopsies in cases of death from peritonitis after abortions. In all of them the post-mortem appearances have been very uniform. I have found from five to ten ounces of thick purulent liquid free in the peritoneal cavity, the intestinal folds bathed with pus and agglutinated more or less by fibrinous adhesions, and the general peritoneum deeply congested, especially in the vicinity of the pelvis. Dr. Draper, Medical Examiner at Boston, in reply to a letter describing the conditions mentioned above, and asking the result of his larger experience in these cases, writes as follows :—"My observations correspond closely with your own, in the pathological conditions usually resulting from criminal abortion.

"In nearly all the cases in which death resulted from secondary complications, and not during or immediately after the operative interference, I have found the cause of death to be peritonitis with the post-mortem appearances which you describe. Usually I have traced the course of events in *this way:* a sloughing placental site, endo-metritis, salpingitis by continuity; finally peritonitis. My cases number twenty-seven, of which more than half have peritonitis written after them."

Upon this subject Dr. Harris, Medical Examiner, says:— "An examination of my records of autopsies for the past ten years shows, that generally, after death by abortion, I have found extensive peritonitis, the intestines glued together and to the peritoneum. The abdominal cavity has contained a large quantity of offensive pus. The pus was largest in amount in those parts of the abdomen to which it would naturally gravitate. There has also been, generally, metritis and salpingitis, on one or both sides. In cases where death has occurred early, the appearances mentioned above have been much modified, or altogether absent."

Against this form of purulent peritonitis, medical treatment has no resources. It is in every instance necessarily fatal. I know of no case in which surgical interference has been attempted, in the treatment of peritonitis following abortion. Yet, since abdominal section with irrigation and drainage of the peritoneal cavity, as we have seen, has combatted successfully other forms of peritonitis, septic and purulent like this, I think we may reasonably hope that laparotomy may, in the future, save at least a portion of these unfortunate patients.

Mr. Tait, who can speak upon the surgical treatment of peritonitis in general with the authority of an experience greater than that of any one else, says, in a written communication to Dr. True—

"In the presence of a grave peritonitis, I occupy myself but little with its cause and character. I first freely open the abdominal cavity, and then conduct myself according to the indications furnished by direct inspection."

Finally, an investigation of the causes that give rise to purulent effusions within the peritoneum, and a consideration of the results obtained by surgeons up to this time by laparotomy, tend to the conclusion, that, whenever pus exists in the cavity of the peritoneum, our only resources are in abdominal section, irrigations, and drainage.

The further lesson unmistakably taught, is, that this simple operation will have a more extended field of usefulness than almost any other that has been an outgrowth of the parent operation, ovariotomy.

ARTICLE IV.

THE RELATION OF TEA DRINKING TO DISORDERS OF THE NERVOUS SYSTEM.

By WILLIAM N. BULLARD, M.D.
OF BOSTON.

READ JUNE 7, 1887.

THE RELATION OF TEA DRINKING TO DISORDERS OF THE NERVOUS SYSTEM.

THE action of tea, as generally drunk, upon the system is twofold, (1) mechanical and (2) physiological. It acts mechanically upon the stomach through the bulk of fluid introduced, causing, when taken in large quantities, a certain distention, and it also, thus taken, acts to produce, aside from any chemical effect, a mechanical diuresis. As usually swallowed also, that is, hot and almost boiling, it acts as a direct irritant to the mucous membrane of the stomach, tending to bring on a condition of gastric catarrh (Lauder Brunton) and likewise as a powerful stimulant to the heart, both directly through the diaphragm and indirectly through stimulation of the gastric nerves.

The physiological action of tea is less well known. That it is in large doses a cerebral stimulant there is no question, but beyond this the exact method of its action upon the nervous system and how far each of its constituents plays a part therein, still remains undetermined. Much more is clear in regard to its action on the digestive organs, and had I time I should be glad to place before you the results of some of the extremely interesting experiments made by late investigators. As it is I can only refer to them in the most hasty way, before passing on to the proper subject of this paper.

In the first place, Dr. Roberts has found that tea has a strongly inhibitory action upon the salivary digestion, even when in very minute proportion, completely paralyzing

the action of the saliva. This he supposed to be due to the action of the tannin. This action may be partially avoided, either by drinking the tea after the meal in such a way that the salivary digestion has taken place before the ingestion of the tea, or by the addition of a little carbonate of soda, which seems to enable the saliva to act. The deterrent effect of tea upon the gastric digestion is well known. Aside from any irritating action upon the gastric mucous membrane, it uniformly retards both peptic and pancreatic digestion, and in this way exerts a very strong injurious influence over the whole system. According to the investigations of Dr. James W. Fraser, very lately published, it retards "the digestion and absorption of all the nitrogenized proximate principles of dietetic substances when peptic and pancreatic digestion are taken together."

From these physiological data it is easy to see what effect we should naturally expect from the abuse of tea. How these expectations are verified clinically I have already in part endeavored to show in regard to one class of cases.

More than a year ago, in April, 1886, I published a short paper containing an account of some investigations on the subject of chronic tea poisoning. At that time I had examined one hundred and sixty-three cases of tea drinkers, mostly women, and also for purposes of comparison one hundred and fifty-eight persons in whom symptoms existed more or less closely resembling those caused by tea poisoning, but in whom I was not inclined to attribute the symptoms to the abuse of tea. The results which I arrived at from that investigation were as follows:

I. That the action of tea is cumulative.

II. That its action is more pronounced on the young and on those subject to anæmia or in a depressed physical condition, although persons otherwise healthy not infrequently show toxic symptoms.

III. That among the class of people under consideration,[1] who as a rule use medium grades of Oolong and Souchong (English Breakfast Tea), the average amount needed to cause toxic symptoms is a little less than five cups per diem.

IV. That chronic tea poisoning is a frequent affection, and that its most common symptoms are loss of appetite, dyspepsia, palpitation, headache, vomiting and nausea, combined with nervousness and various forms of functional nervous affections, hysterical or neuralgic. These symptoms are frequently accompanied by constipation and pain in the left side or cardiac region.

These results have thus far only been confirmed by further observation and examination of this class of tea drinkers.

But it is not on these as a whole that I desire to dwell. My special object to-day is to present to you as clearly and definitely as possible the relation which exists between long-continued or chronic tea drinking and various forms of nervous derangement. First, however, I desire to state distinctly that in what follows reference is made only to *chronic* tea drinkers. I do not intend to discuss to-day the symptoms produced by acute tea poisoning, that is, those following the imbibition of a single large dose of tea or of a few such doses; nor do we refer to those occurring in professional tea tasters. On the contrary, those cases we are considering belong to that large class, mostly composed of women, who for weeks, months or years are accustomed to drink daily a considerable amount of tea, often without taking a proper supply of other nourishment, and frequently when they are from other causes in an exhausted or anæmic condition. And here we beg leave to emphasize a fact, which may perchance seem to some to be almost self-

[1] Those who applied for medical treatment at the Out Patient Department of the Carney Hospital or at the Women's Room in the Boston Dispensary.

evident, but which yet has apparently not been clearly comprehended by some of the more recent writers on this subject, and this is, that the effect of tea varies much in different persons according to their physical condition and to other circumstances, and again in the same person at different times. On those of sedentary habits, or of weak constitution, tea has undoubtedly a stronger influence than on those who are constantly engaged in active exercise in the open air and who are physically vigorous. Moreover, much depends on the amount of food taken with the tea, or at other times. Many women drink their tea, not only with their meals, but at other times also, thereby increasing its deleterious influence, while not a few, and these are the cases in which it specially shows its bad effects, use the tea as a stimulant to support themselves for their daily work while they take little or no other food. The amount of tea taken in this way which will cause unpleasant symptoms is often much smaller than that which can be taken in a proper manner without any evil results. Again, as people become weak or anæmic from overwork, from want of fresh air, or from any other cause, the amount of tea which they could previously take with impunity exerts its toxic action upon the enfeebled system, so that the same person may at different times and under different circumstances be variously affected by the same amount.

These things being premised, we will pass to the consideration of the special subject of this paper.

It is the great prominence of functional affections of the nervous system, which in combination with the other symptoms, gives its peculiar character to the symptom-complex of tea poisoning. It is precisely these (functional) affections of the nervous system, which, when they assume a prominent position in connection with the ordinary symptoms of dyspepsia, should lead us to consider the probability of the toxic action of tea. What these symptoms are, I

will endeavor to state. So far as my personal observations go, they are always functional; but it is not impossible that a long-continued imbibition of very large doses of tea after the premonitory symptoms had been neglected, might, in addition to other causes, eventually help to produce some organic lesion in those previously predisposed. But of this I have personally seen no evidence.

The first sign of disorder of the nervous system in chronic tea drinkers is their general restlessness and nervousness. The normal condition of the nervous system is disturbed and replaced by a condition of hyper-excitability or of less stable equlibrium. This is shown by their want of calmness, their general restlessness and irritability, and the desire to be contantly moving, while at the same time there is a subjective sensation of loss of self-control and of inability to act slowly. Such persons are subject to exaggerated effects from ordinary impressions; they are easily startled, jump at unexpected noises or sensations, or, in other words, react too freely to slight external influences. The moral balance is also affected. This general condition occurs in nearly all those who have been for any length of time under the toxic influence of tea. Indeed, so universal is it in persons of this class that I should hesitate to make a diagnosis of chronic tea poisoning in a case where it was absent, unless the other symptoms were so marked as to render the affection unmistakable. As the toxic effect of the tea increases, this symptom or series of symptoms is apt to increase in severity and may assume some definite form or develop in some special direction. Some patients, for example, labor under a constant fear that something terrible is about to happen, though without any idea as to the nature of the terrible event which is to occur; others, again, say that they become excited whenever they are in a crowd, feeling as though they were afraid of some one, although they know all the while that this sensation is wholly causeless. From

these conditions it is but a step to the various forms of mental weakness and to hysteria.

The next most frequent symptom of nervous origin is palpitation, which was noted in forty-nine per cent. of our cases, and which probably occurred in a still larger proportion. It is but fair, however, to state that this symptom is not complained of in some otherwise well-developed cases, and that at the time of examination no irregularity of the heart-beat in them could be detected.

These two symptoms, nervousness and palpitation, are, however, common to a large variety of affections, and may be produced in many different ways. In chronic tea poisoning they may be caused either directly by the direct action of the tea upon the nervous system, or indirectly through the production of gastric or intestinal dyspepsia. Nervousness, moreover, is so common a concomitant of anæmia or physical depression from any cause that, considered by itself, it could not be judged as in any way distinctive, and it is only from its undue development in proportion to the other symptoms that it acquires value as a factor in the diagnosis. The last clause applies also to palpitation, which frequently occurs, though perhaps not to quite the same extent, in simple dyspepsia, where tea is out of the question. Inasmuch, then, as these two symptoms, nervousness and palpitation, are of such common occurrence in other affections, and, as in the case of the latter symptom, it is not certain that all cases are of nervous origin, we shall for the present make a distinction between them and the more definite symptoms of nervous disorder which accompany chronic tea poisoning, and consider the latter by themselves, only placing among them the more extreme cases of nervousness, such as those already mentioned, where some special form is assumed.

In considering therefore the proportion of cases in which symptoms of nervous disorders occur, we shall leave out

of account those in which nothing more definite than nervousness or palpitation was noted. For while unquestionably many of these cases, probably by far the greater proportion, really belong under this heading, inasmuch as it is impossible with our present knowledge to determine how far this is the case, it seems advisable to consider in this class only those symptoms about which no doubt can be expressed. We shall likewise omit from our classification among cases which have special nervous symptoms all those in which bilateral headaches occurred, unless there appear some distinct reason for the belief that these headaches were either neuralgias proper or otherwise of true nervous origin.

CASES WITH SPECIAL NERVOUS SYMPTOMS.

The total number of cases of this class of which I have records is fifty. The principal divisions are as follows:

Neuralgia	20.
Hemicrania	11.
Migraine	8.
Hysteria	6.
Mental Asthenia	3.
* (Tremor	5.)

By far the most common form of special nervous disorder found in chronic tea drinkers is neuralgia, and of this I have records of twenty cases. The neuralgia does not appear to have any special tendency to affect any particular nerve or group of nerves, but it apparently attacks the locus minimæ resistentiæ, being found in one person in one portion of the body, in another person in some other. The most frequent form was facial neuralgia, which occurred in six cases. Intercostal neuralgia was found in five, occipital neuralgia (including occipital headaches) in five, and sciatica in four. General neuralgia was found in two; brachial, abdominal, lingual and post-auricular in one each.

* See later.

The average number of cups of tea drunk in each case was:

Intercostal Neuralgia	5 cases.	4.4 cups per diem
Occipital Neuralgia	5 cases.	5.5 " " "
Facial Neuralgia	2 cases.	6.25 " " "
Sciatica	2 cases.	5.25 " " "
General Neuralgia	1 case.	8.00 " " "
Brachial Neuralgia	1 case.	5.00 " " "
Abdominal Neuralgia	1 case.	6.00 " " "
Post-auricular Neuralgia	1 case.	6.00 " " "
Total average		5.40 " " "

That all these cases of neuralgia are directly due to tea we do not believe; indeed in some of the cases there is proof of other causes: but in all of them there is reason to suppose that the tea has played some part. In a large proportion of these cases there was either neuralgia in more than one part of the body, or else some other symptom directly referable to the nervous system.

I will here relate one of the more typical cases.

CASE I.—A woman, 23 years of age, came to the Out Patient Department of the Carney Hospital on the 30th of March, 1885. She was suffering at that time from abdominal neuralgia, a dull pain in the sciatic region and pain over the left breast. Palpitation. Constipation. Appetite good. Is nursing a child fifteen months old. She drinks tea, five cups or more a day, taking it at every meal and between meals also. No coffee.

Physical examination shows some tenderness over the left half of the abdomen. Nothing abnormal detected about the heart, or elsewhere. Diagnosis: Hyperlactation. Tea. Abdominal Neuralgia. Treatment: Iron. Liquorice Powder. To stop tea. To wean the baby.

This patient was seen again in March, 1887, two years later. She stated that she was decidedly better for a considerable time after her visit to the Hospital. She had

stopped the tea as directed, though she still took one cup occasionally. She had had some pain in the left side ever since she was at the Hospital, though this had been better for some time after. One year ago she had another child.

She is subject to pains all over at times, but especially in the arms and on the right side of the body. She has now a right facial neuralgia of a week's standing, due to a carious tooth. She has no headaches and but slight dyspeptic trouble. Palpitation however is severe. She is very nervous and easily frightened.

How much of the neuralgia present in this case was due to the influence of tea and how much was due to other causes, anæmia from excessive nursing and a naturally neurotic disposition, it is impossible to say. It is only by collecting a large number of cases like the foregoing and by collation and comparison thereof, that we can arrive at any reliable conclusion. The persistence of the nervousness, palpitation and neuralgia so long after the giving up of the tea proves of course that the tea is no longer in any part an active cause of their presence. But on the other hand there can be but little question that it has in combination with other factors aided in bringing the system into a condition of diminished or depressed nervous vitality, from which it has not been able to recover while under unfavorable surroundings.

Next to neuralgia the most frequent form of special nervous disturbance met with in cases of chronic tea poisoning is migraine and hemicrania. We shall consider these separately, classing under migraine all bilateral headaches, accompanied by nausea or vomiting, not apparently connected with gastric difficulties and recurring with more or less frequency.

Migraine.—We have under this head five reliable cases. It is on account of the great difficulty of determining the precise source of these headaches that I separated them

from the group of hemicrania; yet the same rules apply in a general way to both.

Case II.—Woman, 60. First seen May 18, 1885. Complains of dull frontal headache, which is followed by general weakness of all the muscles, so that she can scarcely move about. The headache is acompanied by nausea, but there is no vomiting. She is subject to attacks of vertigo and is afraid of falling. Appetite poor. Bowels irregular. Drinks *strong* tea—" pure black " —three times a day and occasionally between meals. Mother has attacks of sleep, which last so long, that she has to be wakened.

May 26, 1885. Improved.

Patient was next seen in June, 1887. States that the headaches ceased entirely, but have lately recommenced again under the form of a right hemicrania. There is no nausea or vomiting with the headaches, but she is weak and has to lie down when they come. Dizziness slight, much less than formerly. Appetite fair. Bowels regular. Stopped the tea as directed in 1885, and, otherwise than the headaches, which have lately reappeared, has been perfectly well since. Drinks no coffee. Never had neuralgia or rheumatism.

(This case, which has been placed under migraine, should perhaps, in view of the later history, rather come under the head of hemicrania. It illustrates the closeness of the relation between the two.)

Hemicrania.—Of this we have eleven cases accompanying tea poisoning, not including one case in which the patient drank both tea and coffee. The connection between hemicrania and tea is certainly a very close one. Alcott, as far back as 1839, called attention to tea as a cause of migraine. Whether it be so or not, which I consider doubtful, there can be no question but that there is a close relation between this affection and tea drinking. Since my attention has been drawn to the subject I cannot recollect

having seen a single case of hemicrania in which the patient did not drink tea in greater or less quantity.

Hemicrania existed in eleven per cent. of our tea patients. In some of these it could not have been entirely due to the tea, inasmuch as it had been inherited or had existed before the tea drinking began. In spite of Alcott's statement and those of other writers in this direction, I cannot help feeling that the influence of tea as a *causative* factor in hemicrania has been exaggerated. That it may and in certain cases does tend to increase the frequency and severity of the attacks is possible. But the evidence tends much more in a different direction. It points to the fact that hemicrania or the condition of the system which exists in hemicrania is one which specially craves the momentary stimulus imparted by tea, and causes a demand for it which is easily gratified. There is in my mind but little doubt that the relationship between tea and hemicrania is due rather to the demand of the nervous system in these patients for a mild stimulant rendering them more inclined than the average to drink tea, than to any causative effect which the tea may exert. The average amount of tea drinking in our cases of hemicrania was 4.5 cups (seven cases), or omitting one case in which the patient was very much debilitated, having apex catarrh and nursing at the same time a baby seven months old, and where the amount drunk was only two cups per diem—an exceptionally small amount to have any serious effect—the average was 4.9 cups.

Paræsthesia.—The only other form of sensory neurosis, which has been present in any of our cases, is paræsthesia. This occurred in two cases, in one of which numbness of the hands and feet was complained of; in the other, burning of the palms and soles and a sensation as of cold water pouring over the head and forehead. In the latter case the symptoms were promptly cured by phosphoric acid and the omission of tea. In the former case the symptom men-

tioned in company with neuralgia, palpitation and general nervousness, continued for two years, the patient not having given up the use of tea and not having been under medical treatment. These two cases are not of sufficient importance to lead us to suppose in the absence of other evidence that the tea had any direct connection with the paræsthesia. The amount drunk was not excessive in either case, in one only 4, and in the other 4.5 cups per diem.

MOTOR NEUROSES.

There is no evidence in any case that I have thus far seen that tea as drunk in the cases we have under consideration has any marked effect in producing motor neuroses. There is on the other hand no question but that, when such neuroses exist, if they be not organic, tea should be carefully avoided as tending to further and promote their development. This is especially the case in chorea and all allied affections.

We find among our cases one in which the patient, a boy 16 years old, began to have choreic movements two years after he had given up the tea (green tea) which he had previously drunk in excess. This was unquestionably a mere coincidence. Among all the cases of chorea which have come under my personal observation within the last three years, and of which very full and careful records have been kept—seventy-five—not one has been found in which tea drinking could be assigned as the cause.

Tremor occurred in five cases. Two of these were probably cases of organic disease, two had mental symptoms and others of a character unusual in chronic tea-poisoning, leaving only one in which there seemed a fair probability that the tremor might have been due to the tea. There is no question but that tremor due to tea occurs in tea tasters and is frequent in cases of acute tea poisoning, and Slayter of Halifax relates a very interesting case of

delirium tremens caused by chewing tea, but in the class of cases of which I treat here I have thus far failed to find any evidence of its occurrence.

Muscular cramps or tonic contractions of muscles occurred in three cases. In none of these was the history sufficiently definite to enable us to refer them to the tea.

HYSTERIA AND NEURASTHENIA.

Neurasthenia.—This term serves to cover a number of cases having more or less indefinite symptoms and standing as it were midway between simple nervousness and marked hysteria. The word, as Dr. Wood states, "denotes not a distinct disease but a condition of the body." It is commonly used to comprise those indefinite forms of functional nervous exhaustion, which cannot as yet be placed in any other category. As our knowledge of functional nervous conditions advances and we are enabled to classify them more accurately, more and more cases will be removed from the domain of neurasthenia and placed under some more exact and appropriate title. As things are now it is impossible to draw any accurate line between those cases which should naturally be classed here and those which should more properly fall under other headings. Many cases of exaggerated nervousness are named neurasthenic, and many cases of slight or even moderately advanced hysteria come under this head. For this reason we shall not consider any cases here, but shall try to define and classify more accurately all those cases which were thus designated in the records or elsewhere.

(Of the four cases which were placed originally under this title two fairly belong under the head of hysteria and two to the class of exaggerated nervousness to which I have already referred. The latter cases point to a certain mental asthenia, and if more strongly developed might justly be placed among the milder forms of monomaniacal weakness.)

Hysteria.—Under this heading I have placed six cases, including all those of functional paralysis.

I. Woman, 60. Drinks three to four bowls of tea per diem, though she has lately diminished the quantity to two or three bowls. Is emotional, cries very easily. Globus hystericus. Temporary paresis of left arm accompanied by pain.

II. Woman, 50. Drinks strong tea, six cups or more per diem. Has functional paralysis of the vocal cords.

III. Woman, 34. Came to Carney Hospital, May 6, 1885. Had then been emotional and hysterical for two years. Complained at that time of nervousness, general weakness, palpitation and loss of appetite and was subject to bilateral frontal headaches. Drank tea at each meal and between meals. Treatment: To leave off drinking tea. Dilute phosphoric acid.

Was next seen two years later in May, 1887. States that she got well after her visit to the Hospital and has been well since. Slept better and was not so nervous after leaving off the tea, which she did completely for a time. Now takes two cups of tea per diem with meals, sometimes replacing one with a cup of coffee. Except that she is slightly nervous and has a little dyspepsia, is perfectly well. Never had either rheumatism or neuralgia.

IV. Woman, 45. Always nervous, but lately worse, and irritable with the children and other people. Feels as though she wanted to cry. Subject to hemicrania on the left side. Pain just below the right scapula and also in the left side. Occasional palpitation. Appetite fair. Constipation. Occasional severe pain over the epigastrium, otherwise no dyspeptic symptoms. Youngest child three years old. No uterine symptoms. Drinks about five cups of tea a day; coffee rarely. Is pale, thin and weak. Tongue and lips pale. Heart normal in size—systolic

souffle over pulmonary artery. Nothing else abnormal detected anywhere.

The other two cases are of the same general character as the preceding. In one of them, among the prominent symptoms were lingual neuralgia and functional aphonia.

These cases are of considerable interest as pointing to the influence of tea on hysterical women. That it exerts a specially deleterious effect on the majority of this class there can be little doubt. That a few large doses of strong tea act to stimulate the nerves is well known, but the depressing effect of regularly repeated small doses continued over a considerable length of time has been less frequently emphasized.

Certainly the number of those suffering from hysteria among our tea patients was an uncommonly large one, 6 out of about 170, that is one out of 28, and this from a general clinic and not from one specially devoted to nervous disease.

In cases of this class I believe it to be of the first importance that either all tea should be strictly prohibited, or that it should be given only on the order of the physician and with great circumspection. I regard it as extremely probable, though not yet absolutely proved, that in all cases where the nervous system is deranged, as in hysteria and the allied affections, the action of tea is more powerful than on the normal subject and its influence for good or evil increased.

Mental Asthenia.—In those cases of nervous instability in which the mental symptoms are especially prominent, we are naturally led to be more than ordinarily cautious. The general principles which apply in cases of hysteria hold good also here. Happily most of these cases, though extremely trying both tc the family and to the physician, will, under proper care and treatment, attain an ultimate cure. Chronic by nature, many of these cases test the skill and patience even of the specialist.

Having now given some of the data gathered from our observations on chronic tea poisoning in regard to the frequency with which it is accompanied by the various forms of neurosis, it behooves us to state as clearly as possible our opinion in regard to the relation existing between the two. The conclusions which we have reached are as follows:

1. Chronic tea poisoning produces a condition of irritability or hyperexcitability of the nervous system, and does this both directly by the action of the tea upon the nervous system and indirectly by the production of gastric derangement.

2. Tea taken frequently and in moderate doses for a considerable period of time tends therefore to place the nervous system in a condition in which it is more easily affected injuriously by slight external influences. It therefore favors the production of many forms of functional neuroses, and, if such neuroses already exist, aids in their continuance.

3. There is no evidence that tea taken in the manner described causes any organic nervous lesion, but it is probable that if such nervous lesion should exist, tea thus taken might tend to cause an aggravation and continuance of certain symptoms.

4. There is no evidence that chronic tea poisoning produces unaided any serious functional neuroses in persons not in any way specially predisposed thereto. It does, however, in the manner above described act as an important factor in the production of neuralgia, hysteria and allied affections.

5. When taken constantly in very large doses dyspeptic symptoms usually intervene before irreparable harm is done to the nervous system.

6. In hemicrania and possibly some other functional neuroses there is probably a craving on the part of the nervous system for a slight stimulation, which is better

afforded by tea than by any other equally accessible article, and for this reason patients with hemicrania are so frequently tea drinkers.

In conclusion I beg to say that I should be glad to receive information from members of this Society in regard to the frequency with which tea is used among their patients and in the various places where they practise, and of the results which have come under their observation.

ARTICLE V.

THE TRAINING OF NURSES IN PRIVATE PRACTICE.

By ALFRED WORCESTER, M.D.
OF WALTHAM.

READ JUNE 8, 1887.

THE TRAINING OF NURSES IN PRIVATE PRACTICE.

There is a widespread belief that in sickness as much depends upon the nurse as upon the physician. This belief is founded partly upon fact; for the nurse is the physician's lieutenant, and, of course, it is of as much importance that the medical orders shall be properly executed as it is that they shall be properly given. But such comparisons evince entire ignorance of the physician's responsibilities. It is his duty not only to give proper directions for the management of every patient under his charge, but also to see that his orders are intelligently obeyed. There is no excuse for him in the fact that trusty agents are not at his hand; for it is his business to provide them, and until he can be sure of intelligent, faithful nursing service, he must not undertake the management of more cases of sickness than he can in person superintend.

Where the family or the friends of the patient undertake the nursing service, the physician is partially relieved of responsibility for any improper execution of his orders. It is his duty, however, in such cases to point out the disadvantages of such untrained nursing, if discovered, and to be then ready to supply suitable nurses if wanted.

In times of war and in the hospitals this need of trained nurses has been recognized and met. Thirty-three years ago the Crimean war gave to the world Florence Nightingale, and now, under the banner of the Red Cross, her followers stand ready in every civilized country of the world to imitate her immortal example. Twenty-five years ago

the New England Hospital for Women and Children began in this country the training of nurses; and now scarcely a single hospital can be found that is not reaping the advantages of trained nursing service. Nor are these advantages limited to the hospitals. Trained nurses find an increasing demand for their services in private practice. In no other department of labor is the standard of excellence so rapidly rising. Nursing is already a profession, and no longer a trade of last resort.

One result of this improved nursing service, and of the increasing demand for it, is the high rate of wages that the graduates of the training schools find no difficulty in obtaining at the very beginning of their private practice. Only the more wealthy families can as yet afford to employ them. The whole question of wages, however, depends upon the proportion of the supply to the demand. And families in moderate circumstances will not be able to have better nursing service until the supply of trained nurses exceeds the present demand for them. When that occurs the present prices will fall, and nurses on graduation from the schools will have to be content, as have young members of every other profession, to begin at the bottom, and not, as at present they can do, at the middle of the ladder of earnings.

Inasmuch as by far the greater part of our practice is among that class now deprived of the improved nursing service, ought we not to take measures to supply the increasing demand for it, and to further the spread of its great advantages?

It must be confessed that hitherto the medical profession has not only not taken the initiative in this reform, but has even impeded its progress. Training schools for nurses have been generally at first opposed by the hospital staffs; and the graduates of the training schools have often failed to satisfy the unreasonable expectations of the physicians first employing them. Undoubtedly some of this trouble

has been due to the fact that the physicians have been only indirectly concerned in the nurses' training and, accordingly, have not held themselves responsible for the nurses' advancement after graduation. Nor has it been thoroughly understood that the training the new order of nursing rests upon is designed simply to furnish intelligent lieutenants. Without explicit orders, correcting criticism, and the encouragement of confidence, very likely the old-time nurse will do as well as the best trained nurse.

On the other hand, it cannot be denied that the trained nurses on leaving the hospitals have shown an inability to adapt themselves to the varying service of different physicians, and to the circumstances of private practice. This fault is evidently due to the present methods of training, and can be remedied by sending the student nurses out into private practice, under physicians whose coöperation in their training can be secured.

But it is surely unnecessary at this day to dwell upon the slight disadvantages of the new order of nursing. And it is not so much the purpose of this paper to discuss the possible improvement in the present training schools as it is to demonstrate the way in which the supply of trained nurses can be so increased that their services may be had in every village of the land. At present they can be had only in the larger cities, and even there only the rich can afford their services. Their number, it is true, slowly increases, but not nearly as many nurses as physicians are graduated each year; while, in order to supersede the untrained nurses, it would be necessary to provide probably three times as many trained nurses as there are physicians depending upon their services. It is evident that this large supply, which must be provided before their employment becomes general, cannot be furnished by the present methods of training. The schools connected with the hospitals can train each year only as many nurses as are needed for the

work of the hospitals,—a number much less than that of the yearly graduates in medicine.

If, then, new methods of training must be adopted, in order that the growing demand may be met, and that even in the families where the income is small the patient and the physician may have the great advantages of trained nursing service, it is surely incumbent upon the medical profession to devise and to inaugurate these new methods of training. This duty rests primarily upon the country doctors. In the larger cities the hospital training schools can furnish nurses for the wealthy, and physicians can send their poorer patients to the hospitals, or avail themselves of the excellent system of district nursing—the latest flower in this springtide of charities. But in the smaller cities, and in the towns and villages, the physicians, if they desire the great advantages of this new dispensation, must train their own nurses. It is one of the many new duties that have fallen upon the medical profession; and it is therefore desirable to have some general plan for its performance.

Fortunately, there is no trouble now-a-days in finding young and strong women well fitted and eager for such training. The schools in operation have long lists of applicants who wait their chances to enter. Let it be known in any community that the physicians contemplate instituting a training school, and candidates in plenty will come forward. But they have read "Sister Dora," and perhaps Florence Nightingale's famous Notes, and although they would prefer not to leave their native towns and their friends, they nevertheless desire thorough training. They stand precisely where the would-be doctors stood a hundred years ago, before medical schools were to be found: they want the physicians to teach them. They will gladly work hard for wages that will barely support them, they will gratefully give to the physicians most loyal, hearty service, if meanwhile they can be learning the art of nursing. Let us consider how this should be taught.

From the general similarity of the two professions of nursing and of medicine it is evident that, for excellence in either, much the same kind of training is requisite. The difference between them, however, relieves the nurse of the responsibility of deciding what is the nature of the patient's trouble, and what should be done to relieve it: her only duty is to carry out the treatment ordered, and to note the different symptoms as they occur. The nurse, then, may well be ignorant of the theory, but she must be somewhat acquainted with the practice of medicine. She need not know in any given case why catharsis is advisable, but she must know what to expect when a cathartic is given.

The only exception to this general rule is in the matter of emergencies. In this department it is necessary to drill the nurse so thoroughly that she will always have her wits in working order, whatever her patient's danger may be. There is no use in expecting her to remember blind rules. She must be taught the principles upon which the rules depend. Better far that the nurse shall remember the blood-starved condition of the brain in syncope, than that she should remember any rule for its relief. She must understand the underlying principle if common-sense treatment is expected of her.

But training for emergencies happily demands only a small fraction of consideration. In order that the nurse in general practice may be able to carry out the medical orders intelligently, and report intelligibly the changes that take place during the physician's absence, she must have a working knowledge of elementary anatomy and physiology; of the general progress of the common diseases; and of the effects of the more powerful drugs.

Student nurses should therefore be taught enough anatomy that they may understand the general workings of the body, and be able to use and to understand ana-

tomical terms descriptive of the body's surface. Some knowledge of the structure and function of the lungs, for instance, is prerequisite to any satisfactory realization of the necessity of pure air. And it is a matter of more than mere convenience to all concerned that the nurse and physician shall be able to understand each other's use of the words stomach and abdomen.

In the hospital training schools the student nurses may perhaps safely be left to learn what it is important for them to know about the different diseases as these diseases are met in the wards; but in the country schools, where the nurses' experience is more slowly acquired, they must be taught, before the disease is met, its general characteristics. The special nursing required in typhoid fever, for example, must be taught beforehand if the nurse is expected to take the best care of her first typhoid patient; and this can best be taught by describing the nature of the disease. The medical student is taught not only how to treat but how to diagnosticate diseases that he has never seen; and there is no reason why nurses should not likewise be taught the special nursing needed in diseases they have not seen.

As regards materia medica it is not so plain how much and how little nurses should be taught. The bugbear of the nurse's meddling in the physician's province must not prevent her being taught at least enough about drugs to prevent her from making grave mistakes in administering medicine. Not only is it convenient but it is often necessary to leave medicine, opium for instance, in the nurse's hands to be given *pro re nata* or *si opus sit*. In such cases the nurse must be able to recognize the effects of the drug, and also the indications for its use. There is no danger of the trained nurse's knowing too much, and the more knowledge of medicines she obtains the less likely will she be to attempt to prescribe them.

The instruction in these branches, if it is to be as systematic as it should be, must be given by the physicians in regular lesson hours. The student nurses can be assembled at their headquarters on certain afternoons or evenings. And except when in charge of the very sick it is a benefit to both nurse and patient for the nurse to go out for the freshening walk and for the stimulus that the lesson gives. And again these meetings of the student nurses with the physicians are beneficial to both. The nurse feels her instructor's interest in her advancement, and shares somewhat the enthusiasm of his high calling. The physician, on the other hand, finds it not in the least a disadvantage to be thus forced to review his foundation studies; he acquires a higher appreciation of the importance of the sister-art of nursing; he can realize and sweep away the obstacles to the nurse's success. A good working basis for both is thus established, which in times of anxious watching brings forth the fruit of comfort a hundred fold.

Besides this groundwork that nurses should be taught by their medical instructors, the arts of cooking for the sick, and of keeping the patient and the sick chamber in exquisite order, must be taught them by women who are themselves proficient. The multitude of little ways of giving comfort to the sick, discoveries accumulating rapidly and being disseminated by books, and now also by the nurses' journal, "The Nightingale," can after all be best taught by actual example. In these exceedingly important branches of the nurses' training the students in the hospital training schools have the advantages of working with trained nurses and also with nursing their patients in surroundings especially adapted for the purpose. This latter advantage can be had in the country training schools by making a miniature hospital out of some tenement where a few patients may be collected. And it is absolutely essential

in the country training schools to have at least the partial service of a trained nurse in teaching others to be nurses. Such a teacher can be the queen of the miniature hospital, and at the same time, at the option of the physicians, can follow them on their rounds, visiting the bedsides where the student nurses are employed to teach them there whatever in her more experienced eyes is needed.

In times of unusual healthfulness, the superintendent nurse can teach them how to write good clinical reports, how to take the temperature and pulse, and how to read aloud acceptably. The books upon nursing can then be studied. Upon an improvised manikin, bandaging, fomenting, poulticing can be taught. And upon each other the student nurses can practice massage.

This is a general outline of what every nurse should be taught. But the profession of nursing has already divided itself into specialties. That of nursing the insane can be taught only in the asylums, for physicians themselves have to look thither for the glimmering light of what little has yet been discovered about the comforting care of minds deranged. It is a matter for general rejoicing that the training school at the McLean Asylum, the pioneer school of its kind, is already furnishing trained nurses for these saddest cases.

Monthly nursing, however, will always be the chief specialty, and in no other department is trained service so fruitful of comfort and security. I need not set forth again in detail what monthly nurses should be taught, for I have done that in my manual upon the subject, but I want to call attention to the excellent opportunities physicians have in their private practice to train nurses in this branch. And, after once showing the student nurse how to prepare the bed and how to dress the patient, how after delivery to remove all traces of the labor, and how during the confinement to manage the little details of

bathing, giving enemas, catheterizing, bandaging the breasts, etc., the physician's work becomes delightfully lightened. Nor only this; his patients also are relieved in large part of the usual annoyances and ugly features of midwifery cases.

This general plan of a new kind of training school is no longer visionary. Such a school is already in most successful operation in Waltham, the youngest city of Massachusetts. Its first class has lately been graduated. It is not fitting for me to sound their praises; nor need I here, for they have already won honorable mention in the service of many members of this Society. But as an illustrative case, as a demonstration of the feasibility of the plan, I venture in closing this paper to report the history of the Waltham Training School.

The scheme originated in the local meeting of the Fellows of this Society. In the winter of 1885 a meeting was called of all interested in the project. Three lady managers were chosen, to whom all the details of management were entrusted, and to whose assistance the success of the school is greatly due. A class of seven student nurses was formed, three of whom have completed the two years' course of training. During their first year they served only under the physicians connected with the school, and they were obliged to assemble in the classroom on five afternoons of the week for lectures and lessons. During the second year they served also under other physicians and in neighboring towns, until the last month of their course when they were again assembled for reviews and examinations previous to their graduation.

A second class of eight is now in process of training, and soon a third class is to be formed, for which there are already many applicants. The student nurses are paid, beside their board, \$9.00 per month the first year and \$12.00 the second year. And the school charges respec-

tively \$7.00 and \$10.00 per week for their services where the patients can pay; where they cannot, the nursing service like the medical attendance is gratuitous.

The total earnings the first year amounted to only 90 *per cent.* of the expenses, and the management had to draw upon a guaranty fund that had been established to meet any deficiency; but in the second year the earnings exceeded the expenses. Meanwhile the friends of the school have fitted up a dormitory for the student nurses in connection with the private hospital that has grown out of the original scheme.

It is not, however, because of its financial success that claim for attention is made; nor because of the deeply gratifying effect that such training has upon the student nurses in bringing out into perfect blossom their latent womanhood. For in both of these directions great success has been before recorded. Attention is called to the Waltham School because it is felt that a great and general want has been fully supplied. Nurses are now at hand for any emergency. The physicians have only to call, and the nurses come,—to give their orders, and they are obeyed.

In destitute families where hitherto the hard alternatives have been for the physicians to do the nursing service themselves, or to let the cases go from bad to worse through default of proper care, the student nurses now go gladly for day or night service to carry into effect the physician's good intentions. It is in this kind of service that full warrant is found for appealing to the charitably inclined for the little money that is needed to establish such training schools.

ARTICLE VI.

SEPSIS AND ANTISEPSIS IN SUMMER DIARRHŒA.

By SILAS ALLEN POTTER, M.D.
OF ROXBURY.

READ JUNE 8, 1887.

SEPSIS AND ANTISEPSIS IN SUMMER DIARRHŒA.

WRITERS upon summer diarrhœa appear to be agreed that fermentation holds an intimate relation to the disease.

Dr. H. C. Haven[1] writes, "It will, I think, be universally admitted that, in its totality, summer diarrhœa of infants is a zymotic or fermentative disease."

Maximilian Herz[2] states in regard to cholera infantum, "It is pretty generally admitted that putrefaction of food, as Baginsky maintains, is an important cause of cholera infantum."

J. Lewis Smith[3] says of infantile diarrhœa of summer, "Undoubtedly one of the most important causes is to be found in the very free exhalations arising from decomposing animal and vegetable matter during the heated term, and the disease is always most frequently met with in those localities where the accumulation of filth is the greatest."

It is the object of this paper to collect the more important facts about fermentation, and consider their relation to the disease in question.

The terms sepsis and antisepsis we wish to employ in a broad sense, to indicate, on the one hand, injurious effects resulting from micro-organisms; on the other, influences adverse to the life or activity of micro-organisms.

The alcoholic fermentation is caused chiefly by the yeast fungus, torula cerevisiæ; the bacillus lactis is certainly

[1] Med. Communications of the Mass. Med. Society, 1886.
[2] Wiener Klinik, 1882.
[3] Medical Record, May 25, 1878.

one cause of lactic acid fermentation, and the bacillus butyricus is one cause of the butyric acid change in rancid butter. Of these three fermentative processes it may be affirmed that the principal organism concerned in their production has probably been determined. The organisms referred to have been isolated, a pure cultivation of them introduced into an appropriate sterilized medium, and the proper chemical decomposition obtained.

Other fermentations, such as the acetic, ammoniacal, viscous, putrid, have not been studied with the accuracy which the later methods of research permit. Though due to bacterial action, it is impossible to designate a particular organism as their sole or chief cause. The micrococci found in putrefying material are yet undifferentiated, and the bacterium termo, believed by Cohn to be the essential cause of putrefaction, has already been proved to be a name covering more than a single variety of organism. It is not improbable that the same may be shown to be the case with the micrococcus ureæ, the bacterium aceti, and others.

However, it is not so much with the particular organisms producing these changes that we are now concerned, as with the grand fact, apparently accepted by bacteriologists, that the cause of fermentation and putrefaction is vital. "Micro-organisms," writes Carl Frænkel,[1] "are the producers of fermentation, and, what in the economy of nature is a still more important part to play, are the cause and the only cause of the putrefaction of organic substances." When it was proved that the exclusion of bacteria from a wound was what averted the traumatic infective diseases, a scientific basis was at once given to antiseptic surgery. If we believe that summer diarrhœa in a very large number of instances would not occur but for fermentation, the recognition of the cause of fermentation is the initial step toward an understanding of the disease.

[1] Grundriss der Bacterienkunde. Berlin, 1887.

The action of fermentative organisms in causing diarrhœa is probably indirect, the immediate agents being substances produced by the microbes through the decomposition of the fluids in and upon which they live.

According to Flügge,[1] the chief products of bacterial action are: gases, as CO_2, H, CH_4, H_2S, NH_3; water; sulphur; volatile bodies, as trimethylamin, alcohol, formic acid, acetic acid, butyric acid; fixed acids, as lactic, malic, succinic, oxalic, tartaric; sulpho-acids, as taurin, amides of the fatty acids, especially leucin, alanin; bodies of the aromatic series, as tyrosin, phenol kresol; reduction products, as indol, hydro-paracumaric acid; complex molecules, as carbo-hydrates, pepton, hydro-lytic ferments; coloring matters; and poisonous alkaloids.

Of these substances two classes, some members of which, at least, are produced by the bacteria of fermentation, are interesting in the study of summer diarrhœa: the acids and poisonous alkaloids.

Acids can excite diarrhœa by immediate irritation of the mucous membrane of the bowel, the alkaloids indirectly by systemic effect. The simpler, less violent cases of diarrhœa can often be traced to the irritation of undigested food and the acrid substances produced by its fermentation; the more sudden and violent cases often appear to call for the agency of a poison.

It was long ago noticed that serious illness oftentimes followed the eating of decomposing meat, fish or cheese.

Kerner seems to have been the first to suspect that alkaloids were formed by the decomposition of albumen, and in 1820 called attention to the similarity between the poisoning by sausages and atropia.

Panum in 1856 demonstrated that putrefying substances often contained poisons which, when injected into animals,

[1] Die Micro-organismen. Leipzig, 1886. Also W. Watson Cheyne, American Journal of the Medical Sciences, October, 1886.

caused death. That death was not due to the activity of bacteria introduced into the body, he showed by sterilizing the fluid before injection. He also proved that the inflammatory changes in the intestinal mucous membrane of animals poisoned with putrid material was not caused by the bacteria in the putrid fluid, but by chemical substances which retained their character even after boiling.

Selmi, of Bologna, gave to these alkaloids formed by the decomposition of proteids, the name of ptomaïnes.

Necki in 1876 first obtained ptomaïnes in a pure form and determined their chemical symbols.

Brieger, however, in 1885 produced the most important results which have been obtained in this branch of investigation. From putrefying meat he isolated three alkaloids which he called neuridin ($C_5 H_{14} N_2$), neurin ($C_5 H_{13} NO$), and cholin ($C_5 H_{15} NO_2$). From putrefying fish he obtained neuridin, muscarin ($C_5 H_{15} NO_3$), gadanin ($C_7 H_{17} NO_2$), and a base allied to æthylendiamin ($C_2 H_4 (NH_2)_2 H_3 O$). From decomposing gelatine he separated neuridin, muscarin and dimethylamin. Of these, neuridin is most constantly found in commencing putrefaction. The presence of the others seemed to depend in some degree upon the special substance undergoing decomposition. From putrefying human bodies Brieger obtained several alkaloids, neuridin, cholin, cadaverin ($C_5 H_{16} N_2$), putrescin ($C_4 H_{12} N_2$), saprin ($C_5 H_{16} N_2$), trimethylamin ($C H_3)_3 N$), dimethylamin, triæthylamin, mydaleïn, and a substance of undetermined composition.

The physiological action of these various compounds differs widely. Some, as neuridin, cadaverin, putrescin and saprin are either harmless, or must be injected in very large amounts to produce toxic symptoms; others are violent poisons. Of the latter, there are five which bear an interesting relation to summer diarrhœa: neurin, muscarin, cholin, mydaleïn and the substance of undetermined composition. The action of the first three is essentially iden-

tical. The most important symptoms produced by a fatal dose are salivation, vomiting and diarrhœa, dyspnœa, paralysis and death. Mydaleïn, when injected into guinea-pigs, even in the very minute quantity of three-fortieths of a grain, caused profuse secretion from the eyes, nose, mouth and intestine, dilated pupils, exophthalmos, an increase of temperature, paralysis, fibrillary twitching of muscles, dyspnœa and death. In cats the result was not essentially different, diarrhœa being prominent as before. The substance whose composition was not determined produced in rabbits and guinea-pigs excessive peristalsis and exhausting diarrhœa. In general, it may be said that most of the alkaloids obtained by the decomposition of albumen have a tendency to produce diarrhœa.

It does not follow that, because ptomaïnes capable of exciting diarrhœa are formed outside of the living human body, they are formed likewise within. There are, however, strong reasons for believing that such may be the case.

Substances capable of putrefaction are present in the digestive canal. Of such, the most common in children is milk, but in neither adults nor children can any article of food be assumed to be absent. In many cases, beside food, there will be mucus, serous exudation from inflammatory surfaces, blood, pus and sloughs.

The micro-organisms which accompany and are believed to cause putrefaction, exist in the digestive tract. Johnston, in the examination of the vomitus of seventeen breast-fed infants affected with summer diarrhœa, found invariably micrococci and what is known as bacterium termo. He discovered in diarrhœal fæces innumerable bacteria, especially of the two varieties mentioned. Since the digestive canal is not free from bacteria in health, it must be inferred that while the digestive function is normal, certain conditions exist by which organisms are held in subordination. Spallanzani found that when subtances, in which putre-

faction had already begun, were introduced into a living stomach, the process was checked. It may be supposed that in order to initiate fermentative changes, organisms enter the body in uncontrollable numbers, or that digestion is in whole or in part suspended.

The products of fermentation are found. With the sour vomitus and the acrid or foul stools of summer diarrhœa, all are familiar. The search for alkaloids in diarrhœal excrement has probably not been made, but such have been found in healthy fæces, and that freshly-voided fæces are poisonous has been proved by Bouchard. It is probable that the amount of poisonous alkaloids formed in disease is greater than in health, and also that their quantity and the conditions under which they are produced render them less subject to the eliminative action of the body.

What is known of ptomaïnes throws light upon certain obscure conditions arising in summer diarrhœa. There are cases of cholera infantum in which violent symptoms are followed by speedy death, and yet no appearances adequate to explain the result are revealed by the autopsy. There are also cases of diarrhœa, some acute, others subacute, which a few hours before death show, with the condition called hydrencephaloid, a rise of temperature. The nervous symptoms may be referred to exhaustion. It is difficult, however, to explain the increase of temperature by either exhaustion or a new inflammatory process begun in those last few hours of life. It seems more reasonable to believe that, both in this case and the former, a septicæmia has been induced by the products of putrefaction, either absorbed from the digestive canal, or generated in the exhausted tissues of the body.

It is easily remarked that in no case of summer diarrhœa do the symptoms correspond completely with those following the administration of a given ptomaïne to an animal. Of this, an explanation is offered by the fact that a single

ptomaïne could hardly exist alone in the digestive canal, since both the albumenoids and organisms present are various. Moreover, different ptomaïnes, though they may have similar, may possess antagonistic powers, so that the effect of any one may be modified or even neutralized. It is, therefore, impossible to predict with exactness from experiments outside the human body, what the action of the alkaloids of putrefaction would be when formed within the body.

Many of the expedients which have been found useful in the treatment of summer diarrhœa possess some element unfavorable to the growth of micro-organisms.

The removal of a child from the city to the country or seashore is, in high degree, an antiseptic measure. Investigation of the bacterial contents of the air and earth show that organisms diminish in number as we rise above the surface of the earth, as we penetrate beneath it, and as we go out upon the sea. They are absent in the high Alps, absent or very scarce in the lower strata of the soil, and absent, so far as investigation has gone, in the sea air a thousand miles from land. In the Rue de Rivoli, on the contrary, in the centre of Paris, there are ten times as many microbes in the air, as at the fortifications outside the city; and at Montsouris observatory the north winds blowing over Paris bring many more bacteria than the south winds from the country. The most impure come from the hills of Villette and Belleville, populous quarters, in which also are cemeteries and slaughter-houses. In other words, where there is decomposing organic material, there are bacteria, and the greater the amount of the one, the larger the number of the other. What is true of air is in a higher degree true of water. Condensed aqueous vapor has been found to contain 900 bacteria to the litre, sewer-water from Clichy contains 80,000,000 to the litre. It is where human beings are crowded together in large numbers that the

greatest consumption and excretion of organic matter takes place. It is here, therefore, that the widest necessity exists for those retrograde changes which it is the peculiar province of fermentative organisms to effect. We are justified, therefore, in looking upon filth and sewage as the grand culture medium of fermentative organisms, the special soil in which flourishes the most formidable cause of summer diarrhœa. Removal from this contaminated environment would, therefore, be demanded by theory, and is approved by practice.

It can readily be seen, however, that the advantage which extra-urban residence naturally possesses can be nullified for any particular place by unhygienic local conditions. The insufficient drainage of a country town, the cesspool under the window of an isolated farm-house, create the same danger which is to be encountered in the midst of a dense population. It is in all cases the proximity of decomposing organic material which is to be avoided.

The transference of a child from the bottle to the breast is an antiseptic measure. Milk, as it comes from the breast, is free from organisms, and human milk, even when allowed to stand exposed to the air, is said by Baginsky to resist fermentation a number of hours longer than cow's milk.

The heating or boiling of milk is an antiseptic procedure. The ancients used to quench flints in milk to render it more suitable for diarrhœal patients. Household observation has taught that "boiled milk keeps." The more exact studies of the laboratory have shown that micro-organisms can be killed by sufficient boiling, and that a fluid thus sterilized will remain unchanged until bacteria are again admitted. To employ completely sterilized milk for infant feeding is hardly compatible with the conditions of a nursery. An approach to this can, however, be effected by boiling milk in the same bottle from which it is afterward to be nursed.

The bottle should be stoppered with cotton before boiling, and the stopper removed only when the milk is required for use. Milk, thus prepared, will keep sweet in a warm room for twenty-four hours, while unboiled milk standing in a pitcher by its side, will, in that time, have become sour and coagulated. To thus defer for a few hours the capability of milk to ferment, may be all that is necessary in the treatment of some of the minor cases of vomiting and diarrhœa in infants.

All means for emptying the digestive tract either by withholding food or by giving evacuants have an antiseptic value. On the one hand, micro-organisms are deprived of the material necessary for their growth; on the other hand, both organisms and their products are swept away. Evacuants have from an early period been held in favor in the treatment of diarrhœa. The Greek physicians prescribed mild laxatives to remove the "peccant humors," and Piso, who introduced the use of ipecac for its emetic and cathartic effect in the fluxes, described it, in his extravagant language, as "a sacred anchor and most exquisite gift of nature."

Various drugs have been used to produce disinfection of the digestive tract. To determine the comparative efficiency of these in the treatment of summer diarrhœa does not at present seem possible. It would appear that the value of a particular drug does not depend upon the precise grade of its antiseptic power. A milder antiseptic may, all things considered, be more valuable than a stronger. Nor does it seem probable that complete antisepsis of the digestive tract by drugs is as a rule necessary. The fact that the ordinary processes of digestion are conducted in the presence of bacteria, leads us to think that nature in health exerts a control over micro-organisms. It is probable that she can do something for herself in most cases of disease. The part of medicine, therefore, is so to modify

unfavorable conditions as to restore to nature the control which she has lost.

The main positions advocated in this study of summer diarrhœa are :—

1. That micro-organisms bear an important causal relation to a large proportion of cases of summer diarrhœa.

2. That antisepsis of the digestive tract is an essential element in the treatment of the disease.

3. That antisepsis should include not only the use of drugs, but the establishment of all conditions known to be unfavorable to the life or activity of micro-organisms.

4. That, in order to a more scientific use of antisepsis, we require more adequate information as to what organisms are concerned in the production of fermentation, their life history, and the conditions favorable and unfavorable to their growth.

ARTICLE VII.

A CONTRIBUTION TO THE STUDY OF THE ETIOLOGY OF THE SUMMER DIARRHEA OF INFANTS.

By HENRY C. HAVEN, M.D.

OF BOSTON.

READ JUNE 8, 1887.

A CONTRIBUTION TO THE STUDY OF THE ETIOLOGY OF THE SUMMER DIARRHEA OF INFANTS.

IN a communication entitled "The Etiology and Treatment of the Summer Diarrhea of Infants," presented to this Society at its last annual meeting, I expressed myself somewhat as follows:—

"According to the United States Census of 1880 Massachusetts has a percentage of total deaths under one year to aggregate deaths of 21.99; the lowest State but one, Pennsylvania.

"Massachusetts has a percentage of total deaths from diarrheal diseases to aggregate deaths of 7.83, only four out of the thirty States ranking lower: yet in this same State in 1884 there were 2,089 deaths from cholera infantum, and in the twenty-two years from 1863 to 1884 40,006 infants died from the same cause.

"These figures only partially show the total mortality from diarrheal diseases under one year; for according to the State Registration Report the number of deaths in Boston from cholera infantum in 1884 was 504, while by the fuller report of the Boston Board of Health the number of infants dying from *diarrheal diseases* was 710, a difference of 206. * * * * * * *

"Urban Residence. A second condition which meets with general acceptance as a necessary factor is Density of Population, which, as a rule, is only found in cities and large towns."

"This view is, so far as I know, at present held by all the writers on the subject, whether English, Continental or American.

"The following are fair representative quotations :—

"Dr. Eustace Smith, in his 'Practical Treatise on the Diseases of Children,' makes the following statement as to the causation of 'choleraic diarrhea': 'It is especially a complaint of warm weather, and summer heat must be looked upon as a powerful predisposing cause of the disease. Other agencies, however, must come in as exciting causes, for the affection is not common in country places, and indeed is *rarely seen out of cities.*'"

"Meigs and Pepper in their book 'Diseases of Children' say of 'Entero-Colitis,' 'The most active causes of the disease are the heats of summer, *residence in large cities,*—and this includes higher heat than residence in rural districts,—with greater density of population and more copious filth emanations and improper alimentation.'"

"Dr. J. Lewis Smith, in 'Diseases of Infancy and Childhood,' says 'that "cholera infantum," or as it is sometimes called "choleriform diarrhea," is a disease of the summer months, *and with exceptional cases, of the cities.*'"

"Dr. Lewis Starr states in regard to its etiology that, 'like entero-colitis, it is a *disease of cities*,* finding its victims chiefly among those that live in poverty and squalor.'"

"It seems as if there could be no question as to these views being correct, and yet, in studying the occurrence of the disease in Massachusetts from the mortality reports during the five years from 1880 to 1884, certain apparent facts present themselves which it is difficult to reconcile with the ordinarily accepted opinions.

"A few preliminary words are necessary as to the character and value of these statistics. They are taken from the State Registration reports which are deficient in many respects.

* Italics mine.

"I have only been able to group the deaths from cholera infantum instead of, as I wished, the deaths under one year from all the diarrheal diseases; the later being nowhere accessible. I have assumed, however, that a death registered from cholera infantum must at least be a death caused by a diarrheal disease in an infant. To just the extent that this assumption is not correct the conclusions are invalidated, but it seems to me it must only be in exceptional cases that a death from cholera infantum does *not* mean a death from a diarrheal disease; and such exception again may as well occur in the city as in the country.

"That cholera infantum in Massachusetts is practically the same disease that we have under consideration is shown by the chart, which gives the curve by months of the mean State mortality for five years (vide Chart I.). The curve in the city and country is presumably the same, although the registration reports do not give the data for constructing graphic curves which will verify this statement."

"To return, however, to the statistics of the mortality from cholera infantum in Massachusetts. On studying the number of cases occurring in every town in the State during the five years from 1880 to 1884 I find such apparently contradictory facts that, without a more definite knowledge of the *exact* cause of death and of the differing conditions prevailing in the different towns, it does not seem safe to draw any deductions from the statistics."

"I will only call attention to one table (Table A) which seems of some value.

In this the deaths from cholera infantum are compared with the population, with the births, and with the total deaths under one year in the three following groups:

[1] Seventeen cities with a population of over 15,000; a total population of 892,077.

[2] The towns of 15,000 to 5,000; a total population of 331,644.

[3] The towns under 5,000 (country districts); a total population of 559,364.

"In this table several rather startling figures meet the eye. In the per cent. of cholera infantum deaths to total deaths *under one year* the city and country are *identical*, 27.4. In the per cent. of cholera infantum deaths to births the country shows the best, but even here not as well as the towns of 5,000 to 15,000 population. In the per cent. of all deaths under one to births the cities show the worst, but the towns of 5,000 to 15,000 and the country districts show a very slight difference, and that *against* the country.

"*That is*, these figures, as far as they go, show that while the prevalent opinion is correct that the city is (for some reason) less healthy than the country for babies—inasmuch as 18.1 of those born die under one year in the city against 13.4 in the country, and as, moreover, 5.4 infants under one year die in 1,000 of the population, against 2.4 in the country, more than twice as many—they do *not* verify the ordinarily accepted opinions as to the relative frequency of cholera infantum in the two districts compared as a cause of death in infancy.

"How far these apparent facts will be corroborated by the further study I hope to make is uncertain."

The object of this paper is to present the results of a further study made during the past year.

As neither the deaths under one year from cholera infantum or diarrheal diseases are stated in the State Registrar's report I have had a rescript made from the original returns of the Age (in months and days), Sex, Color, Birthplace, Residence, and Nationality of every infant dying under one year of age in Massachusetts in the five years 1880 to 1884, together with the date and cause of death.

The deaths from diarrheal diseases include all those registered as dying from any of the following causes:—Cholera Infantum, Cholera Morbus, Diarrhea, Dysentery,

Enteritis, Entero-Colitis, Gastritis, Gastro-Enteritis, Gastro-Intestinal Catarrh, Inflammation of the Bowels, and Inflammation of the Stomach.

It was said in the former paper, "The curve [the curve i. e. of the mean monthly mortality from Cholera Infantum] is presumably the same in the city and country, although the registration reports do not give the necessary data for their separate construction."

Actual statistics show the following average mean monthly mortality in Massachusetts during the years 1880–1884 from deaths under one year from diarrheal diseases (in the State as a whole, and in the city and country districts respectively. Vide Charts II. and III.)

It will be seen that the original assumption is entirely borne out; the curves being identical in the two districts.

The second study that has been made from the actual statistics is in reference to the extent of the effect of urban residence.

Is it, as is generally supposed, a most important factor in the production of infantile diarrheal disease, or can the suggestion of the statistics compiled from the registration report [Table A.] be proved a fact by a more exact statistical examination?

To determine this the total deaths under one year from diarrheal diseases have been substituted in Table A. for the deaths from cholera infantum, and the percentages figured on this basis. (Vide Table B.)

In order, moreover, to make the comparative test between city and country districts even more severe than in the former study from the registrar's report I have included in the "country district" no towns having more than 3000 population. In the former study all towns under 5000 were included in the country district.

The correctness of the statistics from which Table B. is constructed cannot, it seems to me, be questioned. If

not, it proves conclusively that in Massachusetts, at least, the factor of urban residence has not during the last five years entered into the etiological sum of the summer diarrhea of infants to any *considerable* extent.

To be sure, in the comparison of deaths from either cholera infantum or diarrheal diseases to population, the city compares most unfavorably with the country; but this is a most fallacious comparison, as has been explained above, and should be studied only in connection with the relative birth rates to the population in the two districts.

In the deaths from diarrheal diseases to all deaths under one year it will be seen that the difference in the city and country is comparatively small; being 28.9 in the former against 24.9 in the latter.

There is only one condition that I can think of that can vitiate the conclusions from these statistics. That is, that first, many infants who have left the city for the summer die in the country from diarrheal diseases, and that many more of this class would have died if they had remained in town; second, that many infants who are *attacked* in the city die in the country districts to which they are removed for treatment, and their deaths are registered as occurring in the "country districts."

But the total average yearly number of infants dying from diarrheal disease in towns in which they were not born is not large, and as such registers probably cover most of the cases instanced above it does not seem as if the conclusions from Table B. can be thereby vitiated.

The time has been too short to calculate the percentages after the subtraction of these "non-resident deaths," but they will be published later with other tables.

If then city residence is *not* to-day in Massachusetts one of the chief etiological factors of infantile diarrhea it is not probable that it constitutes such an essential factor in other states and lands as has been generally considered.

Etiological knowledge is essential to rational therapeutics. My only object is to present facts bearing on the etiology of a disease which is the *third most fatal cause of death at all ages*, although limited in its time of action to the first year of life; a disease which is acknowledgely preventible but which, nevertheless, is the only one of the misasmatic diseases (except diphtheria) which has in Massachusetts practically increased in the last five as compared with the last forty-three years.

The summer diarrhea of infancy is a zymotic disease, and I believe the only factor in its production to be fermentative changes in the food employed or in the intestinal tract resulting in a sepsis of the gastro-intestinal canal; and that all other conditions act only by and through their favoring or causing the presence of these changes.

The sooner this is recognized the sooner will the ravages of this disease cease to be the reproach that they now are to the science of preventive medicine.

CHART I.

Average Deaths from Cholera Infantum in Massachusetts for five years, 1880–1884. From Registration Report.

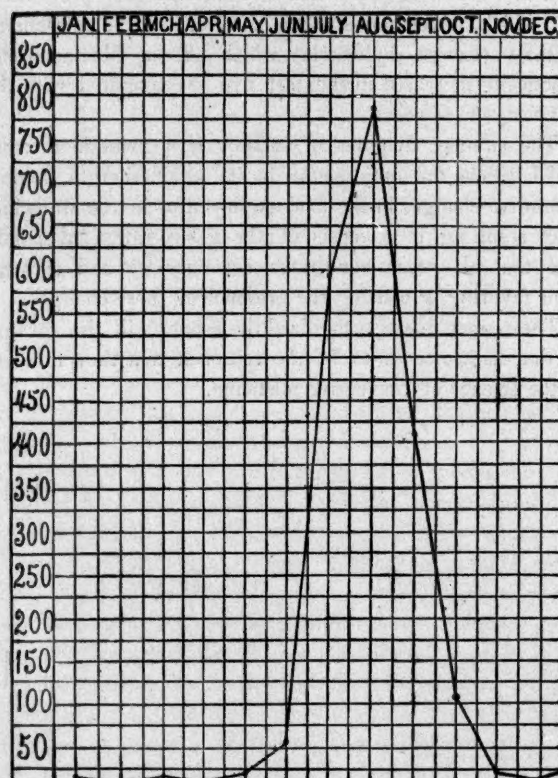


CHART II.

Average Deaths, under one year of age, from Diarrheal Diseases in Massachusetts for five years, 1880–1884.

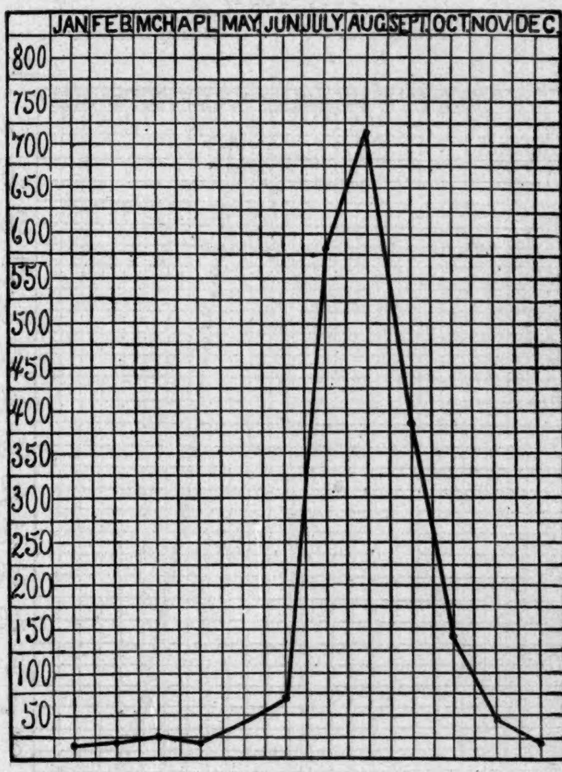


Chart III.

Average Deaths in seventeen cities of Massachusetts and in "Country Districts," from Diarrheal Diseases, under one year of age. For five years, 1880–1884.

——— Seventeen Cities; - - - - Country Districts.

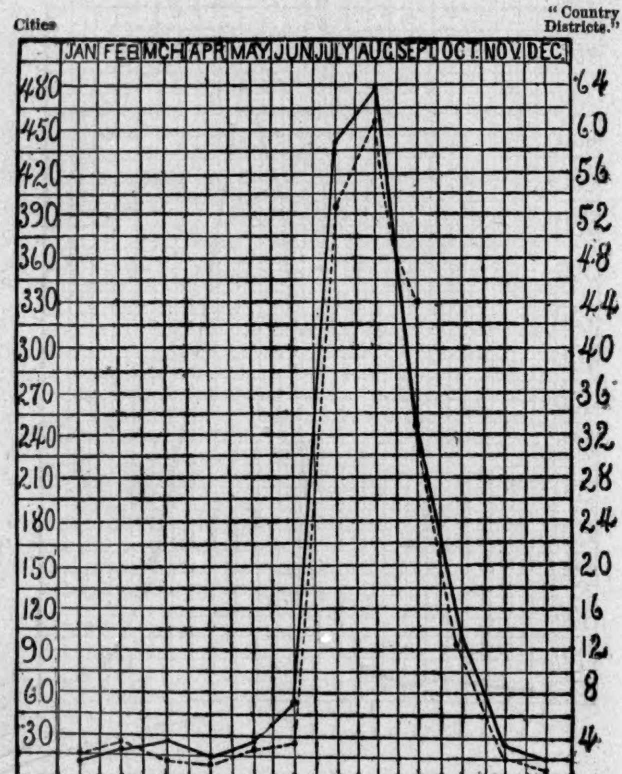


TABLE A.

ANNUAL AVERAGE FOR FIVE YEARS—1880-84.

	Population (census of 1880).	Deaths from cholera infantum.	Deaths under one year.	Births.	% of deaths from chol. infantum to 1000 of population.	% of chol. inf. to deaths under 1 yr.	% of cholera infantum to births.	All deaths under one to births.
Seventeen cities, .	892,077	1320	4816	26,479	0.14	27.4	5.3	18.1
Rest of States,	891,088	712	2639	19,723	0.08	26.9	3.6	13.9
Towns of 15000 to 5000,	331,644	307	1167	8,757	0.09	26.3	3.5	13.3
Towns under 5000 (country districts),	559,364	404	1472	10,965	0.07	27.4	3.6	13.4

TABLE B.

COMPARATIVE MEAN AVERAGES FOR 5 YEARS, 1880-1884, OF THE MORTALITY UNDER ONE YEAR OF AGE FROM DIARRHEAL DISEASES IN MASSACHUSETTS.

	Population, 1880.	Births.	Birth rate per 1000.	Deaths under one year.	Deaths from diarrheal diseases under 1 year.	% of deaths from d. d. to deaths under 1 year.	% of deaths from d. d. to births.	Of all deaths under 1 yr. to births.
Seventeen cities,	892,077	26,232	29.3	4959	1435	28.9	5.47	18.1
Towns, 15,000 to 3,000,	572,175	13,828	23.5	1724	464	26.9	3.35	12.4
Towns under 3,000,	318,883	5,142	15.9	771	158	24.9	3.07	14.9

ARTICLE VIII.

OBSERVATIONS ON THE PUERPERAL PELVIC LIGAMENTS.

By STEPHEN W. DRIVER, M.D.
OF CAMBRIDGE.

READ JUNE 7, 1887.

OBSERVATIONS ON THE PUERPERAL PELVIC LIGAMENTS.

Is there a constant and normal relaxation of these during pregnancy and at term?

Does it occur in the non-puerperal woman?

Does it continue after recovery from confinement? More or less during the early and middle life of a woman?

What are the factors that *prevent*, *determine*, or *vary* this relaxation? Does this relaxation facilitate delivery?

In the following observations the beginning of an answer to these and other questions will be attempted.

PREFATORY REMARKS.

Dr. Thomas Denman, who saw his first case of relaxation of the symphysis pubis in 1774, remarks, "It was for many centuries a received opinion that these bones, though joined together in such a manner as scarcely to afford any suspicion of a separation, were always separated at the time of parturition, or that there was a disposition to separate. But this opinion has been controverted by many writers. But notwithstanding all that has been said, I know *not* that we are authorized to say that a separation or a disposition to separate prevails universally at the latter part of pregnancy or during parturition. Yet that these effects are often, if not generally produced, may be inferred from the pain and weakness so often mentioned and complained of at the parts where the bones of the pelvis are joined together. We leave the question to be settled by future observations."

Dr. Denman seems to have seen very interesting cases, to have taken a very correct view of the subject, and yet with all his shrewdness he did not hit upon a method of actually testing the separation or mobility of the pelvic bones, but only inferred it from symptoms. On page 76 he says, "The opinion of the separation was chiefly founded on the particular attitudes and positions in which the patient sought relief."

Baudelocque says, page 23, "Such has been in all ages the variety of opinions on this point. It is very certain that the bones of the pelvis *may* separate in labor, but that it does not happen so often as has been thought; and experience demonstrates that far from being common it is very rarely met with."

Finally, "According to these observations, the separation of the bones of the pelvis will appear to be an unnecessary accident."

Dewees says, page 22, "We may adduce the following reasons as conclusive against this relaxation being a natural provision:

"1. It is certain that in cases of autopsy the symphyses were very rarely found to have yielded in the *slightest* degree.

"2. That it is not more frequent in the distorted than in the normal pelves.

"3. Were it an arrangement of nature, the means do not seem adequate to the end; i. e. relaxation does not enlarge the diameters.

"4. That where it has been found to have taken place even in a slight degree, it has never failed to create either temporary or permanent inconvenience."

Churchill says, page 40, "From a fair observation of the cases on record, we may conclude that it never takes place as a natural process, but that we occasionally meet with it as an accident."

Playfair, "The ligaments and cartilage become swollen and softened, and the synovial membranes are augmented and distended with fluid."

McClintock, in a note to his edition of Smellie, says, "The slightest physiological degree of separation could not be detected in the living subject by any ordinary modes of examination; and where the separation has been considerable and consequently easy of recognition, very unpleasant consequences with marked symptoms have been present."

Both statements are untrue, for I shall show that a very ordinary "mode of examination" will detect the slightest degree of motion, and in a great many cases a considerable separation, easily recognized, may have no "unpleasant consequences."

MY PREFATORY CONCLUSIONS.

It never seems to have occurred to any of the old or new observers (save one New York man, I believe) to make a test of the actual condition of the pelvic symphyses in childbed through a long series, say of 1000 cases; to test these same cases six months after delivery, and also to test all cases of virgins and women before any childbirth.

In the following pages I shall try to give the results of actual tests through a series of nearly three hundred cases occurring in my own practice. It would have been a great aid to deciding this long doubtful question if, in addition to their admirable series of minute observations, the physicians of the Boston lying-in Hospital had made this test through their first 1000 cases.

The ligaments concerned in the following observations are,

1st. The pubic (a); the superior pubic (b); the subpubic (c); the anterior pubic and the posterior pubic.

2d. The sacro-iliac (s); the anterior sacro-iliac ligament, a continuous band (b); the posterior sacro-iliac ligaments, a group of four bands.

There also comes into consideration the junction cartilage or inter-packing of the sacro-iliac and pubic joining. "Occupying two-thirds of the length and the posterior third of the centre of the junction of pubis we find a true arthrodial articulation, 6 inches in length, 2 in breadth, shaped like an almond, lined by a synovial membrane containing a small quantity of synovial fluid."—*Churchill.*

In testing almost 300 cases at the puerperal period, I think I have determined the fact that the ligaments of the pubic junction vary very much in their development; in many cases the sub-pubic and anterior especially seem to be a strong, firm and well-developed band making a smooth arch; in others a careful examination would almost lead one to believe that there was no true sub-pubic or anterior ligament, but that the joint depended upon the cartilage or membrane to hold it together. This is often the case in delicate women; you can feel the bony structure almost as plainly as in the pelvis I hold here. That a similar proportional development prevails or exists in the sacro-iliac ligaments may be inferred from a study of the skeleton, and from certain facts that I have observed. They cannot be tested because they (the sacro-iliac) are so deeply covered in the overlying tissues. If at the time of confinement these ligaments are relaxed, and if also the interstitial cartilage is deficient or in a soft and undeveloped stage, or infiltrated, then the pubic bones, instead of forming a firm arch, move the one on the other, as the patient turns on the bed, draws up her limbs, or later, attempts to stand or walk. This motion is, at the pubes, up and down, and in extreme cases of relaxation backward and forward. At the sacro-iliac it is pivotal, the sacrum being the fixed point on which the iliac turns.

(Here the reader demonstrated how sometimes the sacrum is the pivot and sometimes the iliac is the fixed point.)

Both sacro-iliac junctions may be relaxed, or only one. In testing the cases following, I have been accustomed to use this method; either immediately after confinement or within the first three days; while the patient is lying flat on her back, with both legs extended, I pass my forefinger within the vulva under the arch, pressing back with the end of the finger the meatus urinarius, and thus having the pubic junction resting on the first joint or phalanx, I ask the patient to draw up her leg, first one and then the other. I can perceive the slightest motion, for there is nothing between the ligaments and my finger but the mucous membrane. The weight of the leg is a strong leverage, acting through the iliacus and psoas muscles as they pass over the horizontal ramus of the pubes. The internal muscles of the thigh that are attached to the pubes also aid. For instance, as the patient draws up the left leg, the left pubic ramus will be pressed downward and its motion will be felt and can be measured by the finger. If the right leg is lifted from the bed, the right pubic ramus will be depressed. When the test is made with the patient standing on her feet, the reverse will be the case; if she stands on her left foot, the weight of the RIGHT leg and side of the body will carry that side down and the left pubic ramus will go up; if she stands on her right foot, the right ramus will ascend. This is the most radical test of pubic motion. If the tissues of the mons veneris are thin, the motion can well be perceived with the fingers pressed on the front of the junction, or even grasping it above and below.

The amount of motion that you can determine at the arch is not the measure of the whole motion at the joint. That is, if the pubic bone of the left side, for instance, projects by the other one fourth of an inch, one fourth of an inch does not express the whole motion. See the position of this in Fig. 1, where *a* indicates the vertical centre of the

pubic junction, with the patient standing on her right leg and the left bone projecting one quarter of an inch.

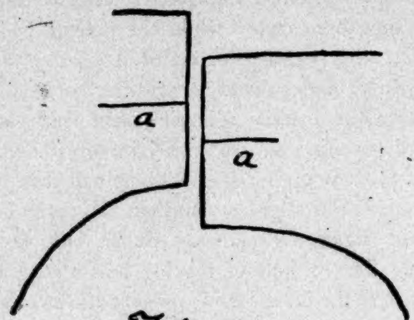


Fig 1

Now let the patient stand on her left leg, and the parts will assume the position of Fig. 2, where the right bone projects one quarter of an inch.

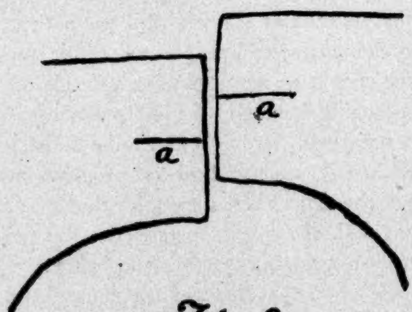


Fig 2

But, however, the vertical centre has not moved back merely to its normal, a distance of ¼ of an inch, but by that normal, ¼ of an inch upward, making the whole motion ½ of an inch or double the measure of projection under the arch.

OBSERVATIONS, 1st SERIES, 200.

Since January 1st, 1878, I have made it a rule to test every case of confinement if possible, and have recorded the results under the following heads. The series includes 224 cases.

Series,		224
Not tested,	24	
Tested,	200	
		224

No motion	52	or 26 per cent.
Slight "	62	or 31 " "
Marked "	34	or 17 " "
1-16 of an inch "	8	or 4 " "
1-8 inch motion	16	or 8 " "
1-4 " "	22	or 11 " "
1-2 " "	6	or 3 " "
	200	

Requiring treatment, 4, or 2 per cent. Of these, 2 Americans, delicate; 2 Irish Americans, 1 hardy, 1 delicate; ages from 24 to 32; motion in three cases half an inch; in 1, only 1-8 of an inch.

3d HUNDRED CASES.

2d Series, 300; 25 not Tested.

Firm	16	plus	52	equals	68	24 2-3	per	cent.
Sl. m.	25	"	62	"	87	32	"	"
M. m.	6	"	34	"	40	15	"	"
1-16	4	"	8	"	12	4 1-3	"	"
1-8	15	"	16	"	31	11	"	"
1-4	8	"	22	"	30	11	"	"
1-2	1.	"	6	"	7	2 1-2	"	"

Requiring treatment, 4, or 1½ per cent. No motion in 25 per cent. Bones movable in 75 out of 100. Decided mobility, 120 out of 275, or 44 per cent.

Dewees and Baudelocque say that it is rare to find a slight degree of separation.

1st Series of 175 different Individuals.

American	56
Irish American	47
Nova Scotian	6
Colored	1
Irish	42
English	14
Scotch	4
French	3
Swedish	1
Italian	1

One half inch motion	6	3 3-7	per cent.
One fourth " "	16	9 1-7	" "
One eighth inch motion	27	14 2-7	" "
One sixteenth inch motion	7	4	" "
Marked motion	26	14 6-7	" "
Slight motion	42	24	" "
No motion	51	29 1-7	" "

Pelvis was found firm in 51 out of 175, or 29 per cent.; 70 per cent. movable.

Physique of Firm Cases.

Strong, Robust	40 per cent.		20
Medium	34 " "		17
Delicate	26 " "		13
	100	Series	50

Physique of Movable Cases, 100 in Number.

Delicate Physique	30	(65)	
Medium "	35		
Strong "	35		
	100		Series of 100

Mrs. G. Aged 26, American, of abundant means; third confinement. Seen by me but once before confinement. During the last month was unable to walk well; shuffled in her gait; was unusually large. Taken in labor, Nov. 11, 1873. Found her with os dilated and bed flooded

with liquor amnii; yet I ruptured a second membrane and there was a further gush of water. Labor short and easy. On the 15th day patient said to me, "What makes my bones crack and snap every time I turn in bed?" "Bones crack! what do you mean? what bones?" I looked incredulous, as doctors do look when they think their patients are talking bosh. "Why these bones right here," said she, putting her hand on her symphysis pubis. I of course put my hand on the junction and made her turn over, first one side and then the other, asked her to draw up first the right leg and then the left. The displacement was excessive, one ramus slipping by the other with an audible snap like the muffled slipping of a dislocated joint into its socket. I was very much astonished, as I had read of such a case but considered its occurrence a most rare and remote possibility. I made the test as I have before indicated with my finger under the arch, and it was apparent that the motion was a full half inch. There was great tenderness over the symphysis. I proceeded to treat this case with a strong band of twilled cotton, five inches wide, fastened as firmly about the hips as the patient could bear; this was kept from slipping upwards by two perineal straps one inch wide, stuffed with hair to prevent chafing. This case was so extreme that my patient did not attempt to walk till the fiftieth day. Even then she was inclined to slide her feet along the floor. Inasmuch as she had been unable to go up and down the stairs before her confinement I had an elevator constructed, and she never walked over the stairs for a year. In May, 1874, she became pregnaut again, and as there was still a considerable mobility, I had a band constructed to support the abdominal tumor, which was applied after the uterus arose from the pelvis. She was confined in March, 1875, with no untoward symptoms, and there was but little more separation than during the pregnancy. I used the band as a precaution, and she got up

with no impairment of her walking powers. In June, 1879, the motion of the bones at the pubes was very marked, and yet no complaint was made by the patient. Also I tested the case at the beginning of 1880, and found no perceptible change, in 6 years and 6 months.

I think that the large uterine tumor before the confinement in 1873 acted on the pelvic bones like a great elastic dilating cone, and so tended to spread the bones. In this case there were tenderness and lameness in the *left* sacro-iliac synchondrosis, before her confinement. I think this indicated motion only in L. S. I. junction.

Mrs. M., 24 years old, very delicate and anæmic before marriage; American; confined February 22, 1875, at 7 months; has had several miscarriages; had concealed uterine hæmorrhage in the first stage of labor; large flat clots were expelled with the child. Did well. On the 21st day after confinement tried to walk. I asked her to try in my presence; she crept or rather shambled across the floor, complaining bitterly of pain at the symphysis pubis. I tested her by putting my forefinger under the arch and making her stand first on one leg and then on the other, and also making her walk. A limited amount of mobility was found, less than one eighth of an inch, but very marked and also great tenderness of the junction.

I put on a firm 5 inch twilled cotton band with perineal straps, and she was immediately able to walk with comfort; all complaint ceased after one month. I examined the patient on Dec. 31, 1878, three years after, and found the symphysis still movable. I made the test as I have indicated, making the patient walk while I held the forefinger under the arch. Although the motion was evident, she felt not the slightest inconvenience. I have seen cases where after confinement the amount of motion was much greater, say ½ an inch, and yet there was no pain or impairment of walking power. This case seems to

show that the pathological condition is of more importance than the amount of mobility.

Dec. 11, 1878. Mrs. B. confined, 4th child, short labor, second stage 1 hour. Seen on the 4th day; said she felt well, said it hurt her to move her left leg; left leg was helpless; said, "I was very same way after first child; could not get around for 4 or 5 months, seemed as though it twisted that bone down in front when I tried to walk." I examined the S. P. and found marked relaxation, ½ inch motion, strong. Seen by Dr. Nichols and myself 16th Dec. He found the same relaxation marked; it was a curiosity to him, as it was the first case he had ever examined. Patient gave the following history of her first confinement, which happened two days before the Boston fire. Within a month found her bones hurt her when she moved in bed. Tried to get up at usual time, could not walk, seemed as if that bone right down in front was being twisted like a soft veal bone; she illustrated with her hands. Was obliged to stoop when she walked, with her hands on her knees; used a chair in getting about the room, and had to lie down a good part of the day. Went out of doors for the first time in March. Dr. Q., of Taunton, attended her; did not examine her, did not put on band, did not treat her in any way after confinement. Patient got well without special treatment and did hard work. I attended her in second and third confinement; she did well in both. A short time after second, complained of pain in left hip, which disappeared quickly under simple treatment. No trouble whatever after the third. She has always worked very hard since I have known her.

I applied a 5 inch bandage about the hips, with directions to keep it as tight as she could bear and to remain in bed. Seen again Dec. 26; she was up and about; excused herself on the ground that her child was taken sick; limped a little when she walked, said that the bandage helped her

very much, but that the stays going between the thighs hurt her. I examined and found the bandage high up off the hips and about the waist. I suppose it helped her all the same, for in my subsequent visits I sometimes found it off and sometimes on, and yet she continued to improve. This time I tested her with forefinger beneath the pubic arch as she walked across the floor. S. P. tender; when she threw her weight on the left foot the right ramus descended, on right foot left ramus went down, the whole displacement at least half an inch. She felt pain only in the left sacro-iliac synchondrosis; no motion in right sacro-iliac synchondrosis; gait shuffling. I forbade her to go over the stairs, told her to keep the bandage tight, and explained to her her condition completely. In less than a month she was doing her work as usual and carrying heavy loads of coal up stairs. I examined her at the end of a year and found plenty of motion, yet she was doing hard work and called herself well. I examined her last time, Dec. 20, 1880, and still found plenty of motion.

The fourth case was not seen by me, but occurred in the practice of a New York doctor. She was a lady of the highest intelligence, and an artist. I got the account from her lips. She was disabled before her confinement, so as to be obliged to keep her room practically; she walked with her hands braced on her knees, sliding her feet along the floor. At time of confinement her labor was almost powerless and she was unable to make expulsive efforts, until her physician, who recognized her true condition, fastenend a strong band about her hips; then the labor progressed and terminated naturally. After labor she was treated by rest in her bed and the firm hip band. During her next pregnancy, her doctor applied the supporting band that I have before alluded to. This was used after the uterus arose from the pelvis. In the subsequent labor she had no difficulty, and although there was some relaxation she was able to be up and on her feet.

When the first two of this series of cases was reported before the Boston Obstetrical Society, Dr. Lyman reported one case of extreme relaxation, which occurred in his practice; it was treated with a strong band and perineal straps; his band was applied with strong buckles so that it could be drawn very tight; he reported a perfect cure with complete immobility. Dr. W. L. Richardson also reported a case coming under his observation in his office practice, which was evidently chronic; the patient ordinarily walked well, but was subject to fits of pelvic lameness (if I may so call it). There was a motion of one half inch, as I remember.

Dr. B. F. D. Adams, of Waltham, reported a case of four months' abortion in which this relaxation was very marked; this was the only one he had seen in his practice.

Mrs. J. P. Irish American; aged 28; quite anæmic; delicate and soft fleshed. Has had two children; confined May 30th, 1882. Pains slow. I left her with os dilated to size of a quarter dollar, as there had been no pains for an hour. Gave directions to send for me at once if pains came on, being distant 5 minutes off. Pains came on, and *I* was not sent for, but an old woman *was*. When I arrived child was born, and she had a smart flow, sending her pulse up to 120 and making her look white. I delivered placenta and flowing ceased. She made a slow but good recovery. The motion of the pubic bones was half an inch. I advised her to keep on a tight bandage for a month after. She complained of no soreness at the symphysis while in bed. I concluded that she was one of those cases that are not lamed or crippled by the great mobility of the pelvic bones, owing to the absence of pathological condition. But on August 3d, while on a visit to her sick child, she complained to me of her inability to walk without pain at the pubes, and also that there was a "snap or click with each step." I tested the condition by finger under

the arch, while she stood alternately on one or the other leg. I found a good half inch motion, also a crepitus like the slipping of a dislocated bone into place. I ordered cold bathing, massage, and a good strong 5 inch band with perineal straps, fastened very firmly. This gave her comfort at once, and after a year she ceased to complain and did her work over stairs without trouble.

She is able to take care of a family of four, and yet there is still great mobility.

I have never but once found this relaxation in non-puerperal or sterile women, or in virgins, and yet the number tested is so small as not to prove a law.

I recently tested the pubic joint in a young woman, just past thirty, and found a motion of $\frac{1}{8}$ of an inch; she was unmarried and without doubt had never been pregnant.

A NEW STUDY OF THE PELVIS.

A. I took an articulated female pelvis of the skeleton, fastened the junctions firmly with elastic rubber bands; marked two fine points on the *sub-pubic* arch on each side of junction, 6-20 of an inch apart; the *distance* between two fine points, one on each tuber ischii, was 82-20 of an inch apart. Then separating the sub-pubic junction till the two points were 7-20 of an inch apart (a separation of pubic junction of 1-20 of an inch), and fixing all fast, the distance between the two points on the ischia measured 89-20 of an inch, an increase of 7-20 or nearly 1-3 of an inch. The above motion is represented by the separation of two radii whose centre is at the centre of the symphysis, and terminations at the two points on the ischia. In the pelvis of my experiment the rocking motion of the pubic junction was on the vertical centre, so that as I *opened* the sub-pubic 1-20 of an inch, the supra-pubic *closed* 1-20 of an inch.

Thus the result of a separation at the sub-pubic junction of 1-20 of an inch *may* increase the distance between the ischiatic tuberosities 1-3 of an inch minus, and 1-10 of an inch separation nearly 2-3 of an inch; a very significant and important factor in the passage of a head through the outlet.

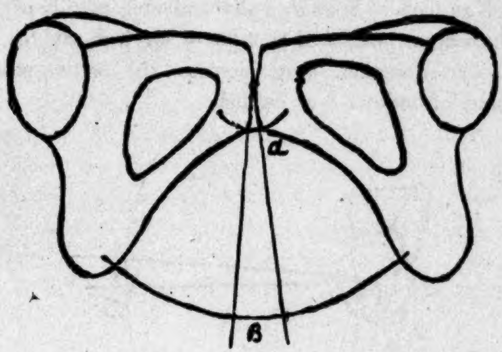


Fig. 3.

B. Second experiment. Having fixed the pelvis firmly in its normal condition, I measured the distance between two fine points, the one on the anterior margin of the coccyx, and the other on the inner margin of the pubic arch, at 70-20 of an inch; then *flexing* the iliac (i. e. motion upward) on a pivot through the *centre* of its junction with the sacrum, so that there was a motion forward at the sub-sacro-iliac junction of 2-20 of an inch, and again measuring between coccyx and pubes, the distance was 77-20 of an inch. Or in other words an extreme *pivotal* motion of 2-20 of an inch at the lower *margin* of the sacro-iliac junction meant an increase or decrease of the antero-posterior diameter of the outlet of 1-3 of an inch minus, as the iliacs are carried upward or downward (flexed or extended) on the spinal column as a fixed point. In a word, by these experiments it is shown that with a very

slight relaxation of the pelvic ligaments and separation of the pelvic junctions, two new factors enter into the problem of the passage of the head through the outlet. *First*, a slight separation (1-20 of an inch) at the sub-pubic junction, *may* increase the lateral diameter between ischia 1-3 of an inch. *Second*, a slight pivotal motion of iliacs on the sacrum, measured as 2-20 of an inch at the sub-sacro-iliac junction, *may* increase the antero-posterior diameter of outlet 1-3 of an inch.

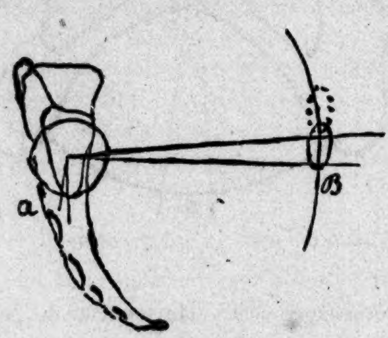


Fig. 4.

Practically, when the woman "braces her feet" she *opens* the antero-posterior diameter, and the child's head, under the force of uterine pains, *spreads* the ischia with all the advantage of leverage. No authors but Playfair and Duncan have recognized this fact in the slightest degree, and they only half, viz.: the flexion and extension of the iliacs on the spinal column. No one that I ever heard or read of, has tested the possible effect of a separation of the symphysis pubis on the distance between the ischiatic tuberosities.

C. Experiment third. With all the pelvic junctions fixed in their normal position, I measured the distance between two fine points, one on the anterior margin of the promontory and one on posterior margin of symphysis, as

91-20 of an inch; then *extending* the iliacs (i. e. moving them downward) with a pivotal motion on the sacrum through the *lower third* of the sacro-iliac junction, the amount of motion as measured at the lower margin of this junction being 2-20 of an inch, I measured the distance between the promontory and pubes as 96-20 of an inch; an *increase* of the antero-posterior diameter of 5-20 or 1-4 of an inch. When the pivot of motion was at the *centre* of the sacro-iliac junction and not at the *lower third*, this increase of diameter was 3-20 of an inch. So that a new factor enters into the problem of the passage of the head through the brim; and all those writers are wrong who say that a *great degree* of separation and relaxation is needed to enlarge the diameter of brim even a *line*. (Dewees says over 1-2 an inch is required "to increase the diameter a line.")

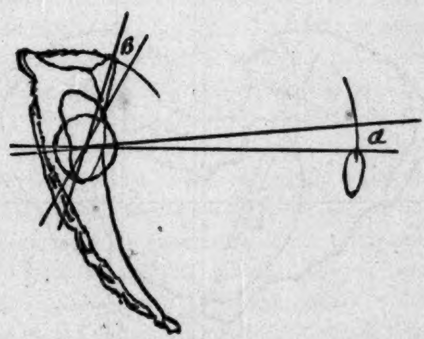


Fig. 5.

The new factor is this: that practically the *straightening* of the body and dropping of the pelvis on the spine tends to increase the antero-posterior diameter of the brim, and a very *small* pivotal motion of iliacs on the sacrum (which a small degree of relaxation will allow), *may* increase this diameter very essentially. A moment's con-

sideration will show that the pressure of the head at the brim tends to carry the iliacs downward and the promontory away from the pubes. Again, according to the authors, it will need a separation of 3 1-7 of a line at the pubes to increase either diameter 1 line ; being misled by the ratio of a circumference to a diameter.

D. But in experiment *fourth* I separated the pubic and two sacro-iliac junctions 2-20 of an inch (it is reasonable to infer that this is posssible in the lesser degrees of relaxation) ; the lateral diameter was increased 2-20 of an inch plus, nearly 3-20 of an inch. This can be shown to be correct geometrically, for this experiment was not the adding to a circle three segments, each 1-10 of an inch, but

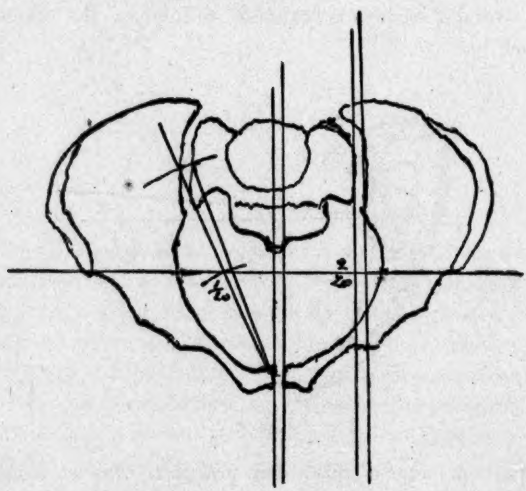


Fig. 6.

for instance, in the case of the sacro-iliac junction and the symphysis pubis, it was the separation of *two parallel lines* 1-10 of an inch (see Fig. 6) ; and in the case of the *right*

sacro-iliac junction it was the motion of a *radius* 1-10 of an inch at its circumference, i. e. at the sacro-iliac, and zero at its centre, i. e. at the symphysis pubis; half way between centre and circumference, on the line of the *lateral diameter* of the pelvis, this motion is obviously 1-20 of an inch minus. (See Fig. 6.)

So that in relaxation of the pelvic ligaments these four (4) factors come in, to facilitate the passage of the head through the brim:—*First*, the extension of the iliacs on the spine, which in effect carries the promontory away from the pubes, increasing the antero-posterior diameter; *second*, separation of the pubes; *third*, separation of the right sacro-iliac junction; *fourth*, separation of the left sacro-iliac junction.

It is possible that the first may be within certain limits, 1-4 inch for every 1-10 inch pivotal motion at the sub-sacro-iliac junction; and that the sum of the last three *may* be 3-20 of an inch *minus* for every 1-10 inch of separation.

My observations through a series of 275 cases show a varying degree of mobility and separation in 75 *cases* out of every 100, and 70 *individuals* out of every 100. This new (to me) study demonstrates that a small degree of relaxation may increase very essentially both the lateral and antero-posterior diameters of the brim, and is a still more potent factor in increasing the antero-posterior diameter of the outlet and its lateral diameter between the tuberosities of the ischia. To the question, "Does the relaxation of the pelvic ligaments facilitate delivery?" the answer is—YES!

FINAL CONCLUSIONS.

My observations continued through a series of 300 cases in child-bed, as well as tests in quite a number of cases of virgins and sterile women, lead me to the following conclusions:—

1st. That the presence of relaxation depends very much upon the strength of the bony and ligamentous structure of the skeleton; that is, it is more apt to occur in the woman of poor physique, the delicate, the soft, the "chicken jointed." Some women can turn their fingers backwards and their ankles over sideways.

2d. That age does not determine its presence, at least the degree of it, as the following cases show.

44	years,	1 case, 1-4 inch motion.
42	"	2 cases, firm; 1, marked motion.
40	"	2, firm; 1, 1-2 inch; 1, marked motion; 1, 1-16.
39	"	1, slight m.; 1, 1-8 motion.
22	"	5, firm; 2, slight; 2, marked; 1, 1-4 inch motion; 1, 1-16.
21	"	2, slight motion; 1, 1-8 motion.
20	"	1, marked motion.
19	"	1, slight; 1, 1-8 motion.
18	"	1, firm.
15	"	1, 1-4 inch motion.

The age of observed cases ranges from 15 to 44.

3d. It is not constant, but a degree of it is natural at time of labor and may exist during pregnancy and even in the early months.

4th. There may be great motion and no lameness or impairment of walking power. Various authors testify to the contrary.

5th. There may be a small degree of motion and great lameness. Baudelocque, page 31, says, "We should be in the wrong if we supposed that such a state of weakness and pain always denotes great disorders in the junction. I am convinced that this may be a consequence of a very small separation or of the slightest movements between the ossa innominata."

6th. Lameness depends upon pathological condition of the junctions, pubic and sacro-iliac.

7th. Pain at the sacro-iliac junction of one side proves that on that side is the pivotal motion of the iliac on the sacrum. It may occur in non-puerperal females, in sterile and virgins.

8th. Patients may recover from a most serious condition of lameness without treatment, as in my 3d case.

9th. The most careful treatment, with all the aids that wealth can bring, may not restore firmness to the pelvis, as in my first case.

10th. Many a case of lingering disability after confinement, with what the doctor considers vague complaints, may have been due to this cause, and it is well, when you cannot find out "what is the matter," to test the condition of the pelvic ligaments.

11th. A small degree of relaxation or separation may facilitate delivery, and may be the factor that saves the use of forceps.

12th. As I am not bigoted, a further examination of the next series of 300 cases may change many of the above conclusions.

ARTICLE IX.

FRACTURE OF THE SPINE:

ITS IMMEDIATE TREATMENT

BY RECTIFICATION OF THE DEFORMITY AND FIXATION BY PLASTER OF PARIS JACKET.

BY HERBERT L. BURRELL, M.D.
OF BOSTON.

READ JUNE 7, 1887.

FRACTURE OF THE SPINE:

ITS IMMEDIATE TREATMENT BY RECTIFICATION OF THE DEFORMITY AND FIXATION BY PLASTER OF PARIS JACKET.

FROM a practical point of view, we may consider dislocations and fractures of the spine together, and it will not be a difficult task to represent to the minds of most surgeons the utter hopelessness of this injury in most cases.

All authorities[1] agree that the prognosis depends largely upon the location of the injury, and the amount of damage done to the spinal cord. It is not the injury to the bony structures or ligamentous union, that renders this injury so fatal, but the pressure or crushing that takes place of that wonderfully constructed spinal cord, which receives and transmits impressions to the various members of the body.

The spine itself is so complexly constructed, adapted to so many different movements and purposes, that we can really say, that when it receives an injury, the "back bone" of the human organism is broken.

The cord resting as it does in a bony canal, may be pressed upon by bony spiculæ from any side, it may be pressed upon or severed completely by some sharp fragment, or simply the anterior buttress or body of the vertebræ may be crushed upon itself, without any serious or permanent

[1] Sir Astley Cooper, Fractures and Dislocations of Joints; Malgaigne, Fractures and Dislocations; A. Shaw-Holmes, System of Surgery; Gurlt, Handbuch der Lehre von dem Kurchenbrüchen, Hamm. 1864; Sir Charles Bell, Observations on Injuries of the Spine and of the Thigh Bone, 1824; Hamilton on Fractures and Dislocations; Bryant, Practice of Surgery.

injury to the cord having occurred. This is illustrated in Plate X.

The higher the injury of the bony column, the greater fatality. Gurlt[2] reports that out of 178 cases where the cervical vertebræ were fractured, death occurred in 164, or $90\frac{1}{7}\%$. Out of 184 in the dorsal region, death occurred in 146, or $79\frac{2}{3}\%$. Out of 82 in the lumbar region, death occurred in 56, or $68\frac{1}{5}\%$. This ratio of mortality is quite what we should expect, as the nearer we approach the respiratory centre, the more fatal is the injury.[3]

By the courtesy of the Surgeons of the Boston City Hospital, I have been enabled to collect all the cases (82) that have occurred in that Hospital, and have tabulated them, to ascertain what facts they will show The data thus obtained is represented in Tables D, E, F, G, and H, and the lines represented opposite present a synopsis of the detailed account that appears in the tables.

First, regarding the mortality of these cases, we find that the fatality is very great, and this is represented by Table A 1.

The fatality I have further analyzed to show mortality according to location. This is represented in Table A 2.

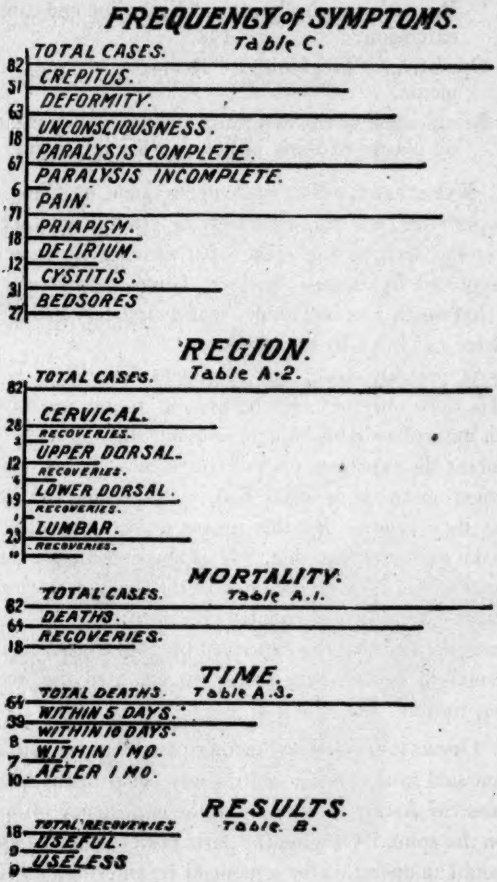
The striking immediate fatality of the accident is shown in Table A 3.

The recoveries have been divided into two classes:—the first, where the patient was useful, in the sense of being self-supporting; the second, useless, where the patient is bed-ridden, and unable to earn a livelihood. So that we really have in these 82 cases of Fracture of the Spine, an apparent recovery of 22%, where really there is only 11% returned as producers in the community. This is shown in Table B.

The ratio of frequency of prominent symptoms occurring after fractures of the spine, is shown in Table C.

[2] Ibid. p. 72. [3] Bryant, ibid. p. 105.

The utter hopelessness which is expressed in the term broken back, pervades the minds of all practitioners, and



perhaps Erichsen[4] expresses the general feeling, when he says that "Fractures of the Spine through the bodies of the vertebræ with displacement, are inevitably fatal."

[4] System of Surgery.

The treatment of fractures of the spine may be divided into three principal heads:—

a. Expectant. Water bed. Air bed. Wire bed. Bonnet's vertebral gutter. Extension and counter-extension.

b. Operative. Trephining. Removal of bony fragments.

c. Rectification of the deformity and fixation of the spine by plaster of Paris jacket or other apparatus.

a. EXPECTANT.—The statements made by Cline[5] and by Cooper[6] that we can accurately determine whether the body, or the arch, or the spine of a vertebra is broken, is not supported by facts. Further, Cline and Cooper believed that death was inevitable, sooner or later, if the fragment were not lifted by an operation.

This is possibly true, but specimens like Plate I. and Plate II. show only too clearly that, at times, we have to do with an irremediable injury, and our duty in such cases is to pursue the expectant plan of treatment—that is, placing the patient on an air or water bed, and treating the symptoms as they arise. By this means we can prolong life, and make existence bearable. It is possible that a certain amount of relief may be obtained in these severest cases by permanent extension and counter-extension.

Having decided that the expectant plan of treatment must be pursued in certain rare cases, we come to our second division, that of

b. OPERATIVE.—What further can I say to you than has been said in that bitter controversy between Sir Charles Bell[7] and Sir Astley Cooper, as to the expediency of operations on the spine. Only on the parts posterior to the spinal cord, could an operation for a moment be entertained; for to

[5] Chelius Surgery, Vol. 1, p. 590.
[6] Sir Astley Cooper on Disl. and Fract., 1851, p. 479.
[7] Observ. on Injury of the Spine and of the Thigh Bone.

attempt to remove the body of a vertebra after fracture of the spine from behind, would necessitate the division of the spinal cord; to attack it in front would be equally inad-

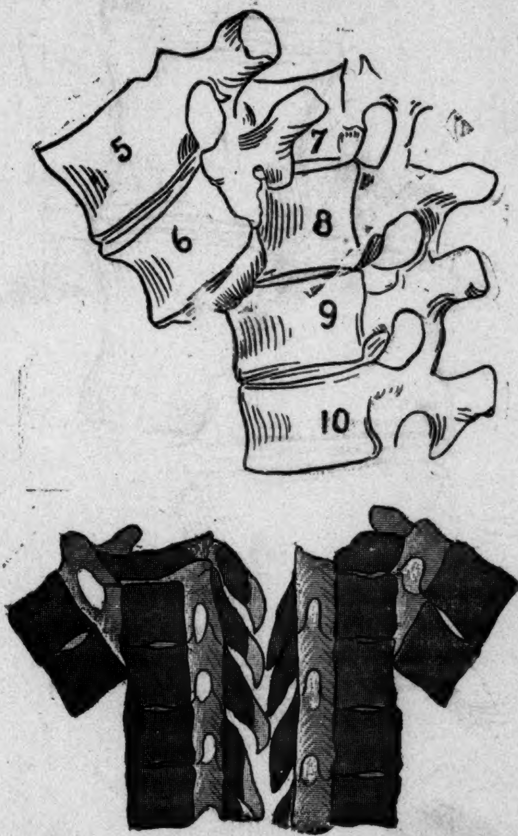


PLATE I.

(No. 1229 WARREN MUSEUM.)

The patient fell 30 feet. Wild and irritable, complete paralysis, bed sores, cystitis and death from exhaustion in two months. There has been a complete rupture of the intervertebral substance between the 6th and 7th vertebræ, the upper edge of the 7th being carried away to the right side with the 5th and 6th vertebræ. The state of the spinal cord in this case may be imagined.

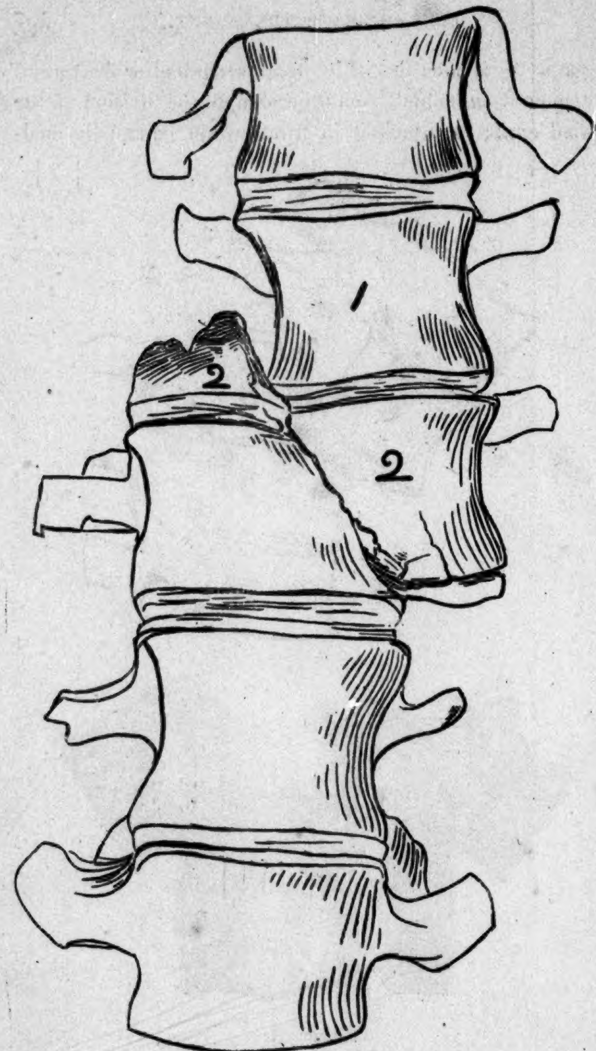


PLATE II.

(No. 139 WARREN MUSEUM.)

T., æt. 19, run over by a fire engine. Complete paraysis, bed sores, cystitis, and died of exhaustion. There is a very extensive fracture and displacement of the 1st and 2d lumbar vertebræ. Cord completely destroyed.

(Table D.) TABLE OF OPERATIONS.

Number.	Name. Date. Reference.	Age.	Sex.	Surgeon.	Character of Accident.	Seat of Injury.	Crepitus.	Deformity.	Unconsciousness.	Paralysis.	Pain.	Priapism.	Delirium.	Cystitis.	Bed Sores.	Deaths.	Autopsy.	Remarks.
21	J. G. Jan. 14, 1867. vol. 9, p. 200.	40	M	Cheever.	Fell 25 feet, striking back.	5 & 6 dorsal.	yes	yes		Complete.	yes	yes	no	no	no	yes, next day.	no	An incision six in. long through muscles to spine. The spinous processes of 2. 3, 4, 5. d. vert. were found broken off, and were easily removed. Portions of laminæ of 3 and 4 removed with trephine and "rongeur" forceps. All spiculæ and sharp points removed. Cord exposed from 2 to 5 d. vert.; opposite the 3d, slight laceration of cord. Emphysema was now first noticed on r. side, and soon covered it. Pulse and respiration better than at beginning of operation. Pupils contracted; surface warm; cold compress on wound. Conscious that night; took nourishment well. Paralysis continued. Urine did not flow until pressure was applied: priapism nearly gone. Comfortable until noon of next day, when dyspnœa became marked. Became unconscious; died at 2 P.M.
22	J. G. Aug. 6, 1867, vol. 14, p. 156.	33	M	Homans.	Fell few hours before entrance	Tenderness, 7th cervical, 1st dorsal.	no	no	no	Complete below nipple.	yes	no	no	no	no	yes, 48 hrs.	no	An incision over 1 and 2 d., and 7 cerv. vert. was made. Some abnormal mobility was found, but no crepitus.
23	R. S. Dec. 14, 1867, vol. 13, p. 186.	36	M	Cheever.	Standing in a cart, horse started, patient thrown, striking on back.	6th cervical, dislocation.	no	yes	no	Complete of legs; partial of upper extremities.	yes	no	no	no	no	yes, within 24 hrs.	yes	9 P.M. same day, Dr. C. saw patient, and found cavity at nape of neck. Just above 7 cervical, spinous processes of 4, 5, 6 cerv. vert. could not be felt. Patient could rotate head, but pain over 7 cerv. vert. Decided to wait until morning. On A.M. following, Dr. C. made incision 3 in. long, extending from 7 cervical upward, without ether. 6 cerv. vert. found dislocated forward; no force could bring it into place. Spinous process and r. lamina and part of left lamina of 6th vert. and part of lamina of 5th removed by trephine; cord laid bare for 1 in. in length and nearly its whole breadth: membrane not ruptured. During operation, slight pressure was accidentally made on the cord; immediately patient would show signs of severe pain; pulse was slowed, and became intermittent; the moment pressure was removed, the pulse returned to its former condition. Application of cold produced the same effect. Little blood lost, and strength good: brandy twice. From this he failed rapidly: temp. 110° in axilla at 5 P.M.: and died 6 P.M. *Autopsy.*—The 6 cerv. vert. was dislocated forward, its articular processes being in front of those of the 7th. No fracture of bone, or laceration of ligaments; an abrupt depression in spinal canal at point of dislocation. Post. lig. stretched tightly over upper margin of 7 cerv. vert. Cord and membranes normal to the eye.
70	J. C. Aug. 20, 1884, vol. 121, p. 175.	28	M	Gay.	Fell 3 stories.	4th dorsal.	yes	yes	yes, at first.	Complete below 5th rib.	yes	no				4th day.	no	An incision was made over spines of upper dorsal vert. Spinous process of 4th was found to be broken off, its body tilted and dislocated inwards, the articular processes of the vertebra visible. Extension, movements of neck and body, and traction by forceps, all failed to accomplish replacement.
71	S. G. Dec. 28, 1884, vol. 126, p. 72.	53	M	Gay.	Attempted to get out of bed quickly; feet caught in sheet; fell, striking on neck and shoulders.	5th cervical.	yes	yes	no	Complete.	yes					In 36 hrs.	no	Dr. Gay cut down on to the deformity, but failed to reduce it.

NUMBER.	NAME. DATE. REFERENCE.
23	
28	J. W. Aug. 29, 1 vol. 30, p.
33	P. C. Aug. 31, 1 vol. 43, p.
35	C. M. March 23, vol. 45, p.
43	J. B. Sept. 10, 1 vol. 61, p.
51	C. E. Sept. 6, 18 vol. 84, p.
54	W. P. Sept. 26, 1 vol. 92, p.
57	W. W. Aug. 12, 1 vol. 98, p.
62	S. D. June 3, 18 vol. 103, p.
59	H. B. W March 22, 1 vol. 101, p.
63	T. T. June 20, 1 vol. 103, p.
73	M. C. May 27, 18 vol. 128, p.
80	G. F. Nov. 24, 18 vol. 151, p. 1
78	H. S. Aug. 10, 18 vol. 138, p. 1

(Table E.) TABLE OF AUTOPSIES.

Number.	Name. Date. Reference.	Age.	Sex.	Surgeon.	Character of Accident.	Seat of Injury.	Crepitus.	Deformity.	Unconsciousness.	Paralysis.	Pain.	Priapism.	Delirium.	Cystitis.	Bed Sores.	Death.	Autopsy.	Remarks.
23																		(See Table of Operations.)
28	J. W. Aug. 29, 1870, vol. 30, p. 138.	22	M	Thorndike.	Fell from staging on back.	Tenderness, 7th cervical.	no	no	no	Complete.	yes	yes				4 days		Abdominal breathing; consciousness in special senses preserved to the last. *Autopsy.*—Heart, lungs, spleen, liver, kidneys, congested; 5th cerv. vert. dislocated forward $\frac{1}{4}$ in.; spinous process sunk downward nearly $\frac{1}{4}$ in. from spinous process of 6th vert.; cord considerably softened from 3d to 7th cerv. vert.; effusion of blood under dura mater, at level of 7th cervical and 1st and 2d dorsal nerves, but not enough to compress cord or nerves. The canal was narrowed from 1-8 to 3-16 of an inch.
33	P. C. Aug. 31, 1872, vol. 43, p. 118.	30	M	Gay.	Fell 5 days before entrance, striking on back of neck.	Cervical dislocation.	no	no	no	Complete below nipples	yes			yes		7 days	yes	*Autopsy* showed 5th and 6th cerv. vert. dislocated; softening of cord corresponding to seat of injury.
35	C. M. March 23, 1873, vol. 45, p. 230.	45	M	Thorndike.		4th & 5th cervical.	yes	yes	no	Complete below nipples	yes	yes				next day	yes	Attempts were made in this case to reduce the deformity, without avail. *Autopsy.*—Examinations of organs not remarkable; 3, 4, & 5 cerv. vert. fractured; cord pressed upon and softened. On pressure upon these vertebræ, post mortem, the deformity could be reduced, and pressure of cord relieved.
43	J. B. Sept. 10, 1875, vol. 61, p. 3.	67	M	Gay.	Fell quite a distance; did not enter hospital for 6 days.	5th cervical.	no	slight		Complete.	yes	no	yes	yes	yes	8 days	yes	*Autopsy.*—Granular kidney; cystitis; left pleuritis with effusion; slight lepto-meningitis. There was a fracture of r. transverse process, and part of the body of the 5th cerv. vert., with injury of the inter-vertebral substance.
51	C. E. Sept. 6, 1879, vol. 84, p. 240.	39	M	Fifield.	Struck on head, and knocked to ground.	Dislocation of atlas.	no	yes	yes	Complete.	yes					28 hours	yes	Extreme perspiration and cyanosis. *Autopsy.*—Dislocation of atlas, with rupture of lateral ligaments.
54	W. P. Sept. 26, 1880, vol. 92, p. 24.	52	M	Fifield.	Struck by a railroad train.	Multiple injuries; fracture of 2 or 3 vert. in dorso-lumbar region.	yes	yes	no	No.	yes	no	no			2d day	yes	*Autopsy.*—There was a fracture of 2 or 3 ribs near the dorso-lumbar region. The spine itself was broken transversely through the body of the first lumbar vert., and a segment of the last dorsal vert. was broken off.
57	W. W. Aug. 12, 1881, vol. 98, p. 87.	45	M	Fifield.	While drunk, fell 15 feet.	7th dorsal.	yes	yes	no	Complete.	yes			yes	yes	in 119 days	yes	Next day after entrance, sense of constriction about waist. *Autopsy.*—Pleuritis with effusion; emphysema of lungs; cystitis; pyelitis; fatty liver; fracture of anterior part of 7th dorsal, with compression, and complete disintegration of cord.
62	S. D. June 3, 1882, vol. 103, p. 164.	83	M	Ingalls.	Fell 18 feet.	4th cervical.	yes	yes	semi	Complete.	yes		no	no	no	next day	yes	*Autopsy.*—Fracture of body of 4th with dislocation forward; fracture of transverse processes of the 3d and 4th cerv. vert. Complete disorganization of the cord.
59	H. B. W. March 22, 1882, vol. 101, p. 94.	68	M	Ingalls.	Fell 15 feet, striking on back.	7th to 12th dorsal.	yes	yes	no	Complete.	yes		no	no	no	in 12 hours	yes	Apparent depression at 7th and 9th dorsal, and dislocation, with prominence of the 11th and 12th dorsal, with deflection to the left. Extension to legs; counter-extension by raising foot of the bed. *Autopsy.*—Fracture of the 12th dorsal, with part of the body of 11th; compression of the cord; fractured rib; pyelo-nephritis.
63	T. T. June 20, 1882, vol. 103, p. 254.	27	M	Ingalls.	Fell 15 feet.	6th cervical.	no	no		Complete.	yes	yes		yes	yes	in 69 days	yes	Tympanitis. *Autopsy.*—Fracture of the body (transverse) and articular processes of the 6th cerv. vert.; amyloid degeneration of spleen, liver and kidneys.
73	M. C. May 27, 1885, vol. 128, p. 176.	44	F	Homans.	Fell down stairs.	8th dorsal.	no	no	no	Complete.	yes		yes	yes	yes	in 3 mos.	yes	*Autopsy.*—Fracture of 8th dorsal, with crushing and displacement backwards; traumatic myelitis at seat of fracture. Spinal cord at seat of injury reduced to $\frac{1}{4}$ the size, and on section it was found to consist of a tube, the wall formed by pia, with a small amount of nervous substance adherent, and a cavity the size of a lead pencil, filled with a thin puriform fluid. The cord, for about 1 cm. above and below the above site, was softened, yellow and opaque, there being no distinction between the gray and white portions. At this point, the 8th dorsal was pressed backward so as to reduce the spinal canal one half.
80	G. F. Nov. 24, 1886, vol. 161, p. 125.	74	M	Cheever.	Fell 30 feet.	12th dorsal.	yes	yes	semi	Complete.						in 18 hours	yes	*Autopsy.*—Fracture vertebra; red softening of cord; hemorrhage into pia, plural cavities, lung and mediastinum.
78	H. S. Aug. 10, 1886, vol. 138, p. 136.	45	F	Burrell.	Fell 10 feet.	12th dorsal.	yes	yes	drunk	Incomplete.	yes		delirium tremens	yes 1.8% albumen.		in 2 days	yes	*Autopsy.*—Twelfth dorsal vert. was fractured in upper portion, giving rise to an arching backward of spine, and a projection backward of a plate of bone, which in turn had pressed on the cord. This pressure had led to red and white softening for a distance of about 15 mm. Above this was an extravasation between the dura and periosteum.

Number.	Name. Date. Reference.
66	W. B. April 6, 1884, vol. 119, p. 57.
14	P. R. July 15, 1884, vol. 121, p. 86.
17	F. O. Aug. 24, 1886, vol. 138, p. 181.
81	J. J. Sept. 21, 1886, vol. 139, p. 67.
18	T. S. Nov. 26, 1886, vol. 140, p. 244.

	C. M. May 17, 1887, vol. 147, p. 76.

(Table F.)

Cases treated by Immediate Correction of Deformity, and Fixation by Plaster of Paris Jacket.

Name. Date. Reference.	Age.	Sex.	Surgeon.	Character of Accident.	Seat of Injury.	Crepitus.	Deformity.	Unconsciousness.	Paralysis.	Pain.	Priapism.	Delirium.	Cystitis.	Bed Sores.	Death.	Autopsy.	Remarks.
W. B. April 6, 1884, vol. 119, p. 57.	58	M	Ingalls.	Fell down stairs 20 feet.	Middle dorsal.	yes	yes	no	Complete.	yes		yes	yes	no	11 days.	no	On entrance a plaster of Paris jacket was applied, the patient being suspended by a tripod; deformity reduced by this means; immediate relief from pain; jacket comfortable all the time; could move in bed without pain. Delirium. Death on 11th day, refusing nourishment and stimulants.
P. R. July 15, 1884, vol. 121, p. 86.	37	M	Bolles.	Fall.	Neighborhood of last dorsal.	no	yes		Complete.				yes	yes			Splint of plaster of Paris at once applied. Discharged Oct. 17, 1884, relieved. Sept. 23, 1886, letter: Paraplegia; can feel a few inches down from trunk. Legs are crooked and draw up spasmodically. Constipation. Uses catheter. Sits up 4 to 5 hours daily. No medical advice for a year. Now in New Brunswick.
F. O. Aug. 24, 1886, vol. 138, p. 181.	21	M	Burrell.	Fall 40 feet.	Lower dorsal 12th.	yes	Gen. curve, with knuckle at 12 d. angle 30°	yes at first.	Complete.	yes							Pat. suspended; deformity reduced as much as possible by pressure; "crunching" of vertebræ felt on reduction; p. of P. jacket applied; sensation in limbs returned immediately. Deformity reduced 11 hours after accident; retention and constipation ceased on 3d day. Sept. 2d, patella reflex somewhat exaggerated; no ankle clonus; urine normal. Can move left slightly; r. leg considerably. Oct. 27, '86, has continued to improve in moving legs; can turn in bed; sensation perfect. Nov. 17, '86, p. of P. removed; no patella reflex; no ankle clonus; movement of l. leg good; moves r. toes; cannot lift r. leg; some pain in r. thigh when lifted; strychnia sulph. gr. 1-60, 3td; sits up in steamer chair. Jan. 21, 1887, pat. walking about with aid of chair; power of r. leg slowly improving. Mar. 10, 1887, walks unaided. Apr. 23, '87, walked out in yard; electricity thrice weekly. May 1, '87, examined by Dr. P. C. Knapp; l. thigh and leg, no galvanic reaction; all muscles react to faradic current; r. thigh and leg, no faradic reaction; walks with halt in r. leg. May 4, '87, went home, 129 Chelsea St., Charlestown, Mass. May 5, '87, bar-tender.
J. J. Sept. 21, 1886, vol. 139, p. 67.	38	M	Gavin.	Fall 12 feet.	7th cervical.	no	no	no	Complete.	yes	yes	yes	yes	yes	2 mos.	no	Pat. weighed over 200 lbs.; suspended; great pain and dyspnœa; had to be let down; p. of P. applied while suspended; jacket required to be cut up on 2d day, owing to difficulty in breathing; gaping nearly 1 in.; no improvement from jacket; removed on 6th day; abdominal breathing. 3d day, "girdle" sensation. 8th day, paralysis of arms; slough of ear from pressure. 7th day, incontinence of urine and fæces. At end of one month, dribbling of urine. Bed sores, marked emaciation, delirium, death.
T. S. Nov. 26, 1886, vol. 140, p. 244.	23	M	Burrell, by courtesy of Dr. M. F. Gavin.	Fall into a sewer, 30 feet.	General curve 7th dorsal to 1st lumbar.	yes	yes	20 minutes.	None.	yes, very severe.							Treated by immediate correction of deformity and fixation by p. of P. jacket. Dec. 5th, plaster splint 2 straps applied. Dec. 8th, jacket removed owing to defective padding; knuckle found at 10th dorsal; jacket reapplied; no paralysis. Dec. 9, discharged, own request, against advice, wearing jacket. Feb. 14, '87, walked into Boston City Hosp. for re-application of jacket: no paralysis or pain; slight deformity at 10 to 12 dorsal vert.

CASE UNDER TREATMENT JUNE 7, 1887.

Name. Date. Reference.	Age.	Sex.	Surgeon.	Character of Accident.	Seat of Injury.	Crepitus.	Deformity.	Unconsciousness.	Paralysis.	Pain.	Priapism.	Delirium.	Cystitis.	Bed Sores.	Death.	Autopsy.	Remarks.
C. M. May 17, 1887, vol. 147, p. 76.		M	Gay.	Struck by a falling derrick.	10th dorsal.	yes	angle 45°	yes	Complete.	yes	semi.	no	yes	yes	under treatment		Within a few hours of the accident; pat. was etherized; suspended; deformity was partially reduced, and a p. of P. jacket with shoulder straps was quickly applied. Jacket was uncomfortably tight; 3d day split up over abdomen; 4th day completely, owing to tympanites. Moved toes 2d day, slightly right foot. Has had and has now hyperæsthesia of the legs; this is diminishing. Moved right leg voluntarily the 13th day; left leg as bad as ever. Bed sore over sacrum, also over calf of r. leg. Turns on either side; the jacket very comfortable; cystitis better.

missible, for the thoracic viscera, aorta, solar plexus, and vena cava would forbid; and an attempted removal from the side would be equally inexpedient.

Five cases have been operated upon at the Boston City Hospital, and they appear in Table D of Operations. All ended fatally.

It may be of interest to see the status that this procedure should occupy in Surgery. Paré, Heister, and many of the older authors discussed the propriety of excising portions of the vertebræ or trephining, but Henry Cline[8] first performed the operation at St. Thomas's Hospital, June 16th, 1814. The patient lived seventeen days, and Mr. Cline admitted that the operation hastened the end. Lidell[9] failed to find a single well authenticated successful case. It is certainly true, that Legoust,[10] Jobert,[11] E. Gurlt,[12] Hamilton[13] and Sir Charles Bell[14] all condemn the operation in unqualified terms.

Gun-shot injuries, however, may be excepted from this sweeping condemnation, and all the reported successful cases of operation, closely resemble that done by Louis[15] in 1762, where bony fragments were removed after a gun-shot fracture of the spine.

The removal of fragments after gun-shot injuries to the spine is perfectly justifiable, and will, I believe, give a fair measure of success. In the War of the Rebellion[16] "there were twenty-four cases of removal of fragments of the vertebræ after gun-shot fracture, with fatal results in only

[8] New England Journal of Medicine and Surgery, Vol. IV., No. 1, January, 1815.

[9] On injuries to the Spine, American Journal Medical Sciences, October, 1864; Vol. XLVIII. p. 320.

[10] Chirurgie d'Armee, pp. 341, 352.

[11] Plaies d'Armee a feu, Paris, 1833, p. 125.

[12] Handbuch der Lepre von dem Knochenbrüchen Hamm. 1864, p. 186.

[13] Treatise on Fractures and Dislocations, p. 187.

[14] Observations on Injuries of the Spine and of the Thigh Bone, 1824.

[15] Rêmarques et Observations sur les Fractures et la Luxation des Vertebræ, Mem. Path. Arch. Gen. de Med., 1836, LXI. 2 Série, p. 417.

[16] Hist. of the War of the Rebellion, Pt. 1, Surg. Vol., p. 459.

ten instances." In nine instances, however, of the fourteen examples of recovery, the spinous process, or fragments of it, only were removed. In the five cases of recovery, in which portions of the laminæ or the transverse processes were removed, the results were much less satisfactory, nearly all of the patients having serious disability.

On the other hand, the operating on fractures of the spine, not compound, is not a justifiable measure, and without further evidence supporting this operation, it will have to be placed among the impracticable efforts of experimental or venturesome surgery.

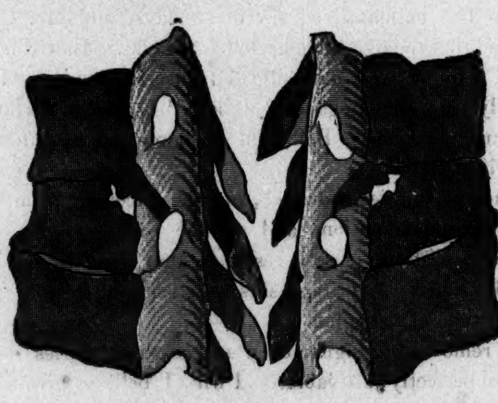


PLATE III.

c. IMMEDIATE RECTIFICATION OF THE DEFORMITY IN FRACTURE OF THE SPINE AND FIXATION BY PLASTER OF PARIS JACKET.—On the 10th of August, 1886, I saw the autopsy of a woman who had been under my care, with a fracture of the spine, in the Boston City Hospital (Plate III. Case 78), and found that a plate of bone from the posterior wall of the body of the 12th dorsal vertebra had been broken off, in addition to an arching backward of the whole spine. This plate had pressed upon the cord, and had, in 38 hours,

led to red and white softening for a distance of 15 mm. The presence of the plate *anterior* to the cord showed me that an operative procedure would have been of no avail, and the *softening* occurring so early in the cord, led me to believe that, if aught was to be done to remedy the damage caused by a fracture of the spine, it must be at once.[17]

The arching of the vertebræ suggested that the difficulty might be overcome by *immediately* pressing back the deformity, and fixing it in this corrected position.

I determined to act upon this principle in the next case. On Aug. 24th, 1886, Case 17 was admitted, and was seen within twelve hours of the time of his fall of 40 feet. The risks of immediate rectification and suspension having been explained to him, he was suspended, as represented in Plate IV., with this difference, that the tripod was placed over the head of the bed, a ward-master was placed upon a small table at either side of the patient to lift up on the body at the axillæ. This, when one has many assistants, is a great aid to the patient. The back of the patient, while being changed from the horizontal to the perpendicular position, should be carefully supported, and when the patient is brought into an erect position the buttocks are free from the table.

The deformity, which was at an angle of at least 30° and included the 12th dorsal vertebra, was reduced, and a plaster of Paris jacket was quickly applied. An anæsthetic was not given, for I did not wish to have any danger masked. The patient's sufferings during the suspension, rectification and application of the jacket, were more intense than anything I have ever seen; he nearly collapsed, but the jacket was finished, and stimulants were given. On recovering himself, he said that there had been an immediate return of sensation in his limbs, directly following the reduction of

[17] Case 80. Red softening in cord. Death in 18 hours. Table of Autopsies, E.

the deformity. His recovery proceeded uninterruptedly. On April 23d, 1887, for the first time he walked out. Dr. P. C. Knapp examined him on May 1st, 1887, and found

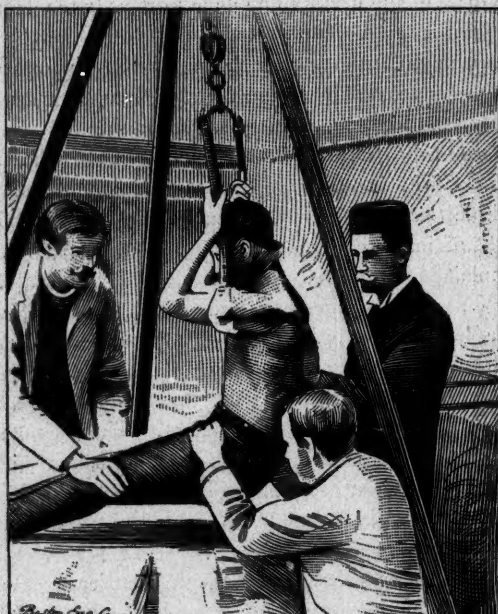


PLATE IV.

in the left thigh and leg no galvanic reaction. All muscles react to faradic current. The right thigh and leg have no faradic reaction. He now walks with a halt in the right leg, and on May 5th, 1887, was found acting as a bar tender. Plates V. and VI. represent his present condition.

This procedure at the time I supposed to be an original thought, but soon found that other gentlemen in the same hospital had preceded me.

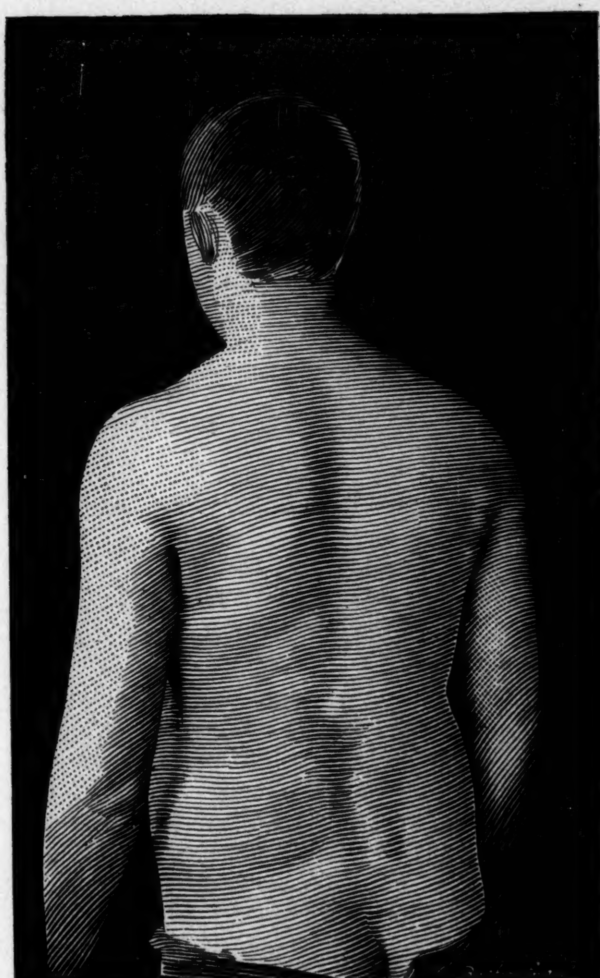


Plate V.

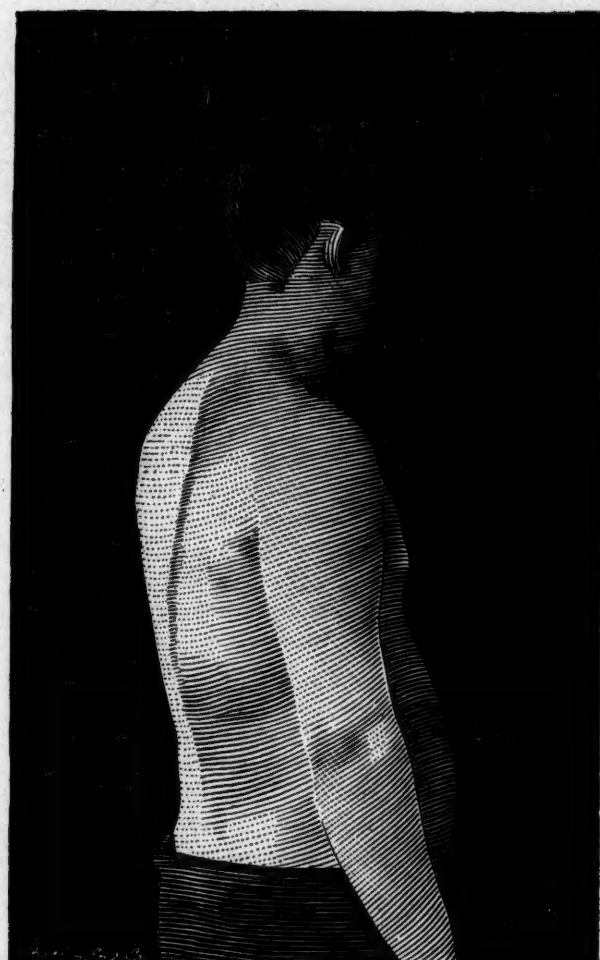


PLATE VI.

Five cases has been treated in this manner in the hospital to a completion. Dr. Wm. Ingalls (Case 66, Table F) on April 6th, 1884, applied a jacket to a fractured spine, the deformity having rectified itself by suspension, but his patient unfortunately died. Dr. W. P. Bolles (Case 14, Table F) on July 15th, 1884, applied a splint of plaster of Paris at once to a fractured spine, and his patient recovered, but is useless. Dr. M. F. Gavin (Case 81, Table F) on Sept. 21st, 1886, rectified the deformity in a fractured spine, having suspended a patient weighing over 200 lbs. Great dyspnœa and pain occurred. The jacket did absolutely no good, requiring to be cut up on the second day, and gaped nearly an inch. The patient died in two months, of exhaustion.

On Nov. 26th, 1886 (Case 18, Table F), by the courtesy of Dr. Gavin I was again enabled to attempt the rectification of a fracture of the 10th dorsal vertebra, and applied a plaster of Paris jacket; this case was seen a short time after the fracture occurred. There was no paralysis, and the patient made a good recovery.

Of these five cases two have died, one is useless, and two have recovered. (See Table F.)

Of the expediency of rectification of the deformity, I can but think that an important lesson can be learned from a study of these drawings of specimens from the Warren Anat. Museum. Plates I. and II. show that any efforts would be futile; while Plates IX., X., XI., XII. and XIII. are very suggestive as to the possibility of immediately rectifying the deformity.

The application of the plaster of Paris jackets for fracture of the spine is by no means a new idea, and the literature on the subject at my command gives me the following facts:

In the fall of 1874 Professor Sayre states that he first applied a plaster of Paris jacket for Pott's disease; and

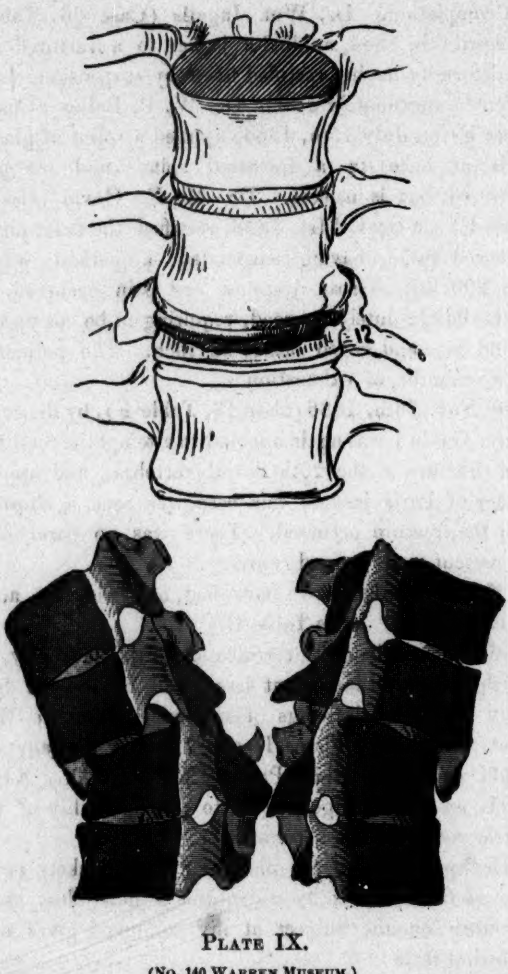


PLATE IX.

(No. 140 WARREN MUSEUM,)

Fracture of 12th dorsal, with displacement; extensive laceration of inter-vertebral substance; cord almost completely severed; death, 9½ weeks; paralysis, bed sores, cystitis.

(Table G.) TABLE OF DEATHS.

Number.	Name. Date. Reference.	Age.	Sex.	Surgeon.	Character of Accident.	Seat of Injury.	Crepitus.	Deformity.	Unconsciousness.	Paralysis.	Pain.	Delirium.	Cystitis.	Bed Sores.	Deaths.	Autopsy.	Priapism.	Remarks.
19	J. S. March 21, 1866, vol. 7, p. 8.	28	M	Buckingham.	Fall.	Upper lumbar.		yes		Complete.	yes	no	yes	yes	Yes Jan. 10, 1867.		no	Treatment—rest in bed; electricity; strychnia, sulph. gr. 1-60 3id. Discharged well, Dec, 4, 1866. Letter from brother May 15. 1887. states that patient died Jan. 10, 1867, from exhaustion, bed sores and inflammation of bladder.
20	M. B. June 15, 1866, vol. 10, p. 57.	21	M	Cheever.		Cervical.	yes	yes	yes	Complete.	yes	no	no	no	June 16, 1866.	no	no	
21																		(See Table of Operations.)
22																		" " " "
23																		(See Table of Operations and Autopsies.)
24	C. C. Oct. 16, 1868, vol. 19, p. 220.	37	M	Thaxter.	Blow on head from falling bale of cotton.	Dislocation of atlas. forward and fracture.	no	yes	no	Complete.	yes				4th day.	no	no	Respiration abdominal; all efforts at reduction futile; death from suffocation.
25	T. C. July 20, 1869, vol. 26, p. 14.	52	M	Ropes.	Pack of leather (150 lbs.) fell on back while stooping.	Cervical.				Complete.	yes				36 hours.	no	no	
26	W. N. Jan. 30, 1870, vol. 25, p. 241.	33	M	Cheever.	Fell 3 stories, striking on back.	Cervical.	no	yes	no	Complete.	yes				Next day.	no	yes	
27	J. M. April 19, 1870, vol. 28, p. 114.	24	M	Thorndike.	Fell from scaffold.	Injury to head, fracture 8th dorsal.	yes	yes	no	Complete.	yes	no	no	no	4 days.	no	no	Much deformity at 8th dorsal; abdominal breathing.
28																		(See Table of Autopsies.)
29	J. D. Nov. 6, 1870, vol. 33, p. 1.	23	M	Thaxter.	Fell 50 feet 9 days before entrance.	Lower lumbar.	no	no	yes	Partial.	yes		yes	yes	18th day after injury.	no		
30	M. F. Jan. 11, 1872, vol. 46, p. 216.	27	M	Thorndike.	Fell 10 feet striking on back.	9th, 10th and 11th dorsal.	yes	yes	no	Complete.	yes	yes	yes	yes	25 days.	no	yes	Day after entrance etherized; deformity reduced by extension and counter-extension, and pressure over deformity; trunk secured to head of bed, and 15 lbs. of extension applied to legs. In 1 week, delirium tremens: incontinence of urine. Failed gradually; death from exhaustion.
31	C. S. July 5, 1872, vol. 41, p. 269.	33	M	Ingalls.	Fell while intoxicated from 3d story window.	Multiple injuries; upper dorsal.		yes	no	Complete.	yes				In 1 week.	no	yes	
32	J. H. Aug. 3, 1872, vol. 43, p. 65.	50	M	Ingalls.	Fell 9 days before entrance.	11th and 12th dorsal.	yes	yes	no	Complete.	yes		yes	yes	1 month.	no	no	Exhaustion.
33																		(See Table of Autopsies.)
34	P. S. Oct. 21, 1872, vol. 43, p. 204.		M	Gay.	Intoxicated; wheel over neck.	6th and 7th cervical.	no	no	no	None at first.	yes				2d day.	no	yes	On entrance, complained of pain in neck; physical exam. negative. In 3 hours legs became paralyzed; abdominal respiration; later, complete paralysis; great thirst; death. Distinct crepitus felt after death, between 6 & 7 cerv. vert.
35																		(See Table of Autopsies,)
36	O. B. July 16, 1873, vol. 47, p. 154.	40	M	Ingalls.		4th and 5th cervical.	yes	yes	no	Below 3d ribs.	yes				Next day.	no	yes	
37	M. F. Oct. 20, 1873, vol. 52, p. 14.	38	F		Fell from 2d story, admitted following day.	Dorsal.			yes	Complete.			yes	yes	3 months.	no		

TABLE G (Continued).

38	M. M. June 12, 1874, vol. 56, p. 26.	38	M	Homans.		Cervical.	yes	yes	no	Below 2d ribs.	yes	no	no	no	24 hours.	no	yes	
39	J. T. Aug. 13, 1874, vol. 53, p. 113.	50	M	Gay.	Tossed by a bull.	3d or 4th cervical.	yes	yes	no	Complete.	yes				Same day.	no		Respiration abdominal; thirst. Died suddenly, speaking 5 minutes before death.
40	E. H. Sept. 2, 1874, vol. 53, p. 143.		M	Gay.	Fell 30 feet.	Lumbar, fracture of pelvis.	yes	yes		Absent.	yes				Next day.	no		
41	E. T. May 3, 1875, vol. 57, p. 270.	33	M	Ingalls.	Fell 18 feet.	7th or 8th dorsal.	yes	yes	no	Complete.	yes		yes	yes	52 days.	no		Incontinence of urine and fæces.
42	J. W. Sept. 12, 1876, vol. 39, p. 271.	34	M	Gay.	Fell 8 feet.	Mid. dorsal.	yes	yes		Complete.	yes		yes	yes	In 1 month.	no	no	Exhaustion.
43																		(See Table of Autopsies.)
44	W. F. Nov. 10, 1875, vol. 84, p. 84.	15	M	Thorndike.	Wheel of cart passed over chest.	4th and 5th dorsal.	yes	yes	yes	Complete.	yes				18 hours.	no		Fract. 3 ribs on right side.
45	J. M. Sept. 26, 1873, vol. 52, p. 14.		M	Fifield.	Fell 2 stories striking on back.	2d and 3d lumbar.	yes	yes	yes	Complete.	no				4 hours.	no		
46	B. M. Jan. 1, 1877, vol. 68, p. 227.		M	Thorndike.	Struck by a falling basket of sand.	Multiple injuries 4th lumbar.		yes							½ hour after admission.			
47	J. F. Oct. 30 1877, vol. 74, p. 132.	45	M	Fifield.	Struck on head by chain of coal scuttle: fell some distance.	Lumbar; Multiple injuries.		yes	no	Complete.	yes				4th day.	no	yes	Incontinence; spinous processes of lower lumbar vert. deflected to one side, and a space existed between 4 and 5 lumbar large enough to lay finger into tympanites; no dejection, even from ol. tiglii gtt. iv.
48	J. K. Aug. 25, 1878, vol. 42, p. 126.	32	M	Thorndike.		12th dorsal.	yes	yes	no	Complete.	yes				Following day.	no	yes	
49	J. M. June 30, 1879, vol. 84, p. 77.	23	M	Homans.	Fell into a vessel's hold.	7th dorsal.	yes	yes	no	Complete.	yes	no	yes	yes	9 days.	no	yes	Tympanites; abdomen tapped with relief.
50	M. P. Aug. 13, 1879, vol. 83, p. 170.	40	M	Gay.	Fell down 10 steps.		yes in lower cerv.			Complete.	yes	no	no	no	Next day.	no	yes	Tympanites relieved by rectal tube.
51																		(See Table of Autopsies.)
52	M. D. Oct. 10, 1879, vol. 86, p. 58.	45	F	Fifield.	Fell 3 stories.	Lumbar.	yes	yes	no	Complete.	yes	no	no	no	6 days.	no		Tympanites relieved by rectal tube.
53	J. H. May 22, 1880, vol. 87, p. 252.	51	M	Ingalls.	Fell 35 feet.	Lumbar.		yes		Complete.					Next day.	no		Death sudden.
54																		(See Table of Autopsies.)
55	P. B. Oct. 14, 1880, vol. 91, p. 21.	42	M	Gay.	Fell 15 feet.	Upper lumbar.	yes	yes	no	Complete.	yes	no	no	no	3d day.	no	no	Death said to be due to œdema of the lungs.
56	P. W. G. Feb. 10, 1881, vol. 94, p. 120.	41	M	Thorndike.	Elevator struck patient on back, "doubled him up."	12th dorsal.	yes	yes	no	Complete.	yes	yes	yes	yes	79 days.	no		Etherized, and by extension, counter-extension and pressure over deformity, the deformity was nearly reduced; kept in position by pads; 10 lbs. extension and tight canvas belt; incontinence; 40 days after entrance, plaster of P. jacket applied; pat. grew steadily worse; death from exhaustion.
57																		(See Table of Autopsies.)
58	J. S. Aug. 22, 1881, vol. 98, p. 100.	32	M	Fifield.	Fell 30 feet.	Multiple injuries, 2d lumbar.	yes	yes	no	Complete.	yes				5 days.	no		Cause of death obscure.

TABLE G (Concluded).

59																		(See Table of Autopsies.)
60	E. W. May 6, 1882, vol. 104, p. 91.	38	M	Homans.	Fell 65 feet.	Multiple injuries, middle dorsal.	no	no		Complete.	yes		yes		8 days.	no		Died suddenly, without cause being known.
61	D. C. May 10, 1882, vol. 104, p. 106.	39	M	Homans.	Fell 30 feet striking back.	1st lumbar.		yes		Complete.	yes	yes	yes	yes	21 days.	no		Œdema of penis; girdle sensation; tympanites.
62																		(See Table of Autopsies.)
63																		" " " "
64	J. S. Aug. 8, 1882, vol. 105, p. 246.	39	M	Thorndike.	Struck on back by a boom.	8th dorsal.	no	yes	semi	Complete.	yes		yes		8 days.	no		Severe pain, with girdle sensation; vomiting.
65	J. C. Aug. 10, 1883, vol. 114, p. 219.	17	M	Thorndike.	Fell 40 feet.	Multiple injuries, double fracture mid. dorsal.	yes	yes	yes	Complete.	yes		yes	yes	4 months.	no		No special treatment; death fram exhaustion.
66																		(See Table for Immediate Rectification of Deformity and Fixation by P. of P. Jacket.)
67	J. C. May 22, 1884, vol. 122, p. 8.	30	M	Homans.	Struck by a boom.	4th and 5th dorsal.	yes	yes	yes	Complete.					24 hours.	no		Concussion of brain; respiration diaphragmatic.
68	F. D. June 12, 1884, vol. 119, p. 260.	25	M	Post.	Railroad accident	Multiple injuries, fract. of mid. dorsal.	yes	yes	yes	Complete.	yes				Few hours.	no		Pulseless at time of admission.
69	W. E. Aug. 2, 1884, vol. 121, p. 132.	65	M	Gay.	Fell down stairs.	6th cervical.	no	yes	no	Complete.	yes		yes	yes	6 days.	no	yes	Cyanosis; diaphragmatic respiration.
70																		(See Table of Operations.)
71																		" " " "
72	J. C. Jan. 5, 1885, vol. 126, p. 92.	65	M	Gay.	Fell from wagon, struck on face.	Cervical.		yes		Complete.	yes	yes	yes	yes	11 days.	no	no	
73																		(See Table of Autopsies.)
74	C. S. Sept. 15, 1885, vol. 130, p. 234.	25	M	Bolles.	Fell from 2d story window.	Dorsal.		yes		Complete.	yes				Same day.	no		
75	E. C. Jan. 6, 1886, vol. 132, p. 261.	42	M	Bolles.	Carriage fell on patient.	4th cervical.	yes	yes	yes	Complete.					Next day.	no		Asphyxia.
76	E. C. Dec. 3, 1886, vol. 142, p. 12.	45	F	Bradford.	Fell 2 stories.	Cervical.	yes	no	at first	Absent.					15 hours.			Spoke five minutes before death.
77	M. C. July 31, 1886, vol. 138, p. 108.	21	M	Bolles.	Railroad injury, multiple.	6th dorsal.	yes	yes	no	Complete.	yes				3 days.	no		No re-action from shock.
78																		(See Table of Autopsies.)
79	B. F. E. Oct. 26, 1886, Carney Hosp.	50	M	Burrell.	Fall from coal bridge 18 feet, striking on back.	9th and 10th dorsal.	yes	yes	no	Complete.	yes	yes	yes	yes	212 days.	no	no	Was transported from Lake Superior to Boston on an air bed; cystitis so severe that it perforated the recto-vesical septum, causing recto-vesical fistula. Complication of dribbling of urine from anus, relieved by glass rectal urinal.
80																		(See Table of Autopsies.)
81																		(See Table for Immediate Rectification of Deformity and Fixation by P. of P. Jacket.)
82	A. M. April 11, 1887, vol. 145, p. 176.	44	M	Gay.	Fell 15 feet.	Lower cervical and upper dorsal.	no	no	no	Complete.	yes	no			40 hours.	no	yes	Fracture bed; tympanites; diaphragmatic respiration. This may be a case of hemorrhage into or about the cord.

doubtless to his bringing this method of treatment of Pott's disease[18] before the profession is due the present application of plaster of Paris jackets in fresh fractures of the spine.

On June 25th, 1879, J. R. Weist, of Richmond, Indiana (see Appendix I.), reduced a fracture of the 9th

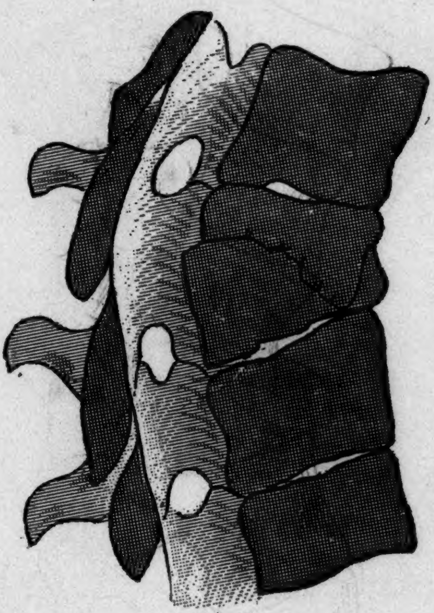


PLATE X.

(No. 1376 WARREN MUSEUM.)

Diagram of a fracture of the body of a vertebra, not narrowing the canal materially.

dorsal vertebra during suspension, and applied a plaster of Paris jacket. This was followed by a great relief to the pain, uninterrupted improvement, and a recovery of the patient on the 67th day.

[18] Succinct History of the Plan of Treatment of Pott's Disease by Suspension and the use of Plaster of Paris Bandage, p. 4.

Dr. Weist says that when he applied the plaster dressing in this case, he was not aware that it had been used in such cases; but he learned from Dr. Sayre that it had been

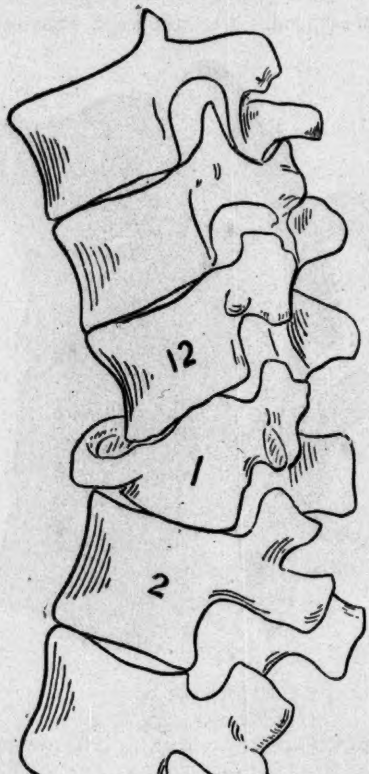


PLATE XI.

(No. 941 WARREN MUSEUM.)

Fracture of 1st lumbar vert. Female, æt. 19; fall, 20 ft., striking on nates. Spinal canal encroached upon. Symptoms.—Complete paralysis, immediate. Results,—Moderate improvement after 3 weeks; power of sphincters regained.

used several times in a similar manner at Bellevue Hospital with very satisfactory results, and says that probably others also have used the plaster jacket in this way. However this may be, Dr. Weist made the report at the

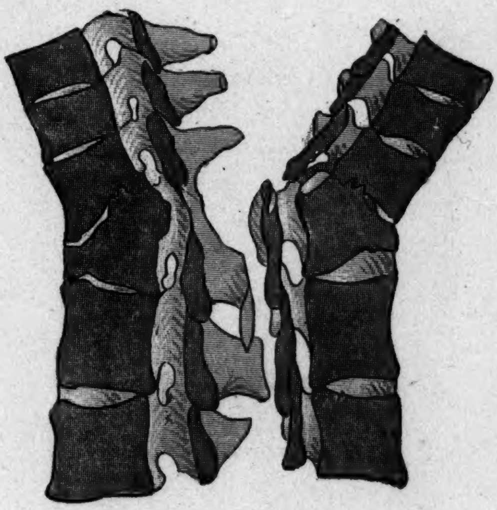


PLATE XII.

(No. 4629 WARREN MUSEUM.)

Old fracture 12th dorsal. Upper edge has been broken away from body of centrum. 12th dorsal vertebra is crushed anteriorly. Considerable narrowing of canal, opposite upper edge of 12th dorsal vertebra.

C. A., æt. 18; fell on plank floor. Paralysis, bed sores, cystitis; death after 2 8-12 years. Cord considerably disorganized at seat of injury.

request of Professor Sayre, and with the exception of an allusion to a case of Spratley's by Reginald Harrison, shown at the Liverpool Medical Institution,[19] Dr. Weist's case is the earliest published record of the procedure that I have been able to find.

[19] Surgical Diseases of the Urinary Organs (Lectures on), p. 51, by R. Harrison, at the season 1878-9.

In the remainder of the year 1879, I find five cases treated in this manner. König, of Gottingen, in 1880 said that having used suspension and plaster of Paris jackets for caries of the vertebræ, where there was paralysis,

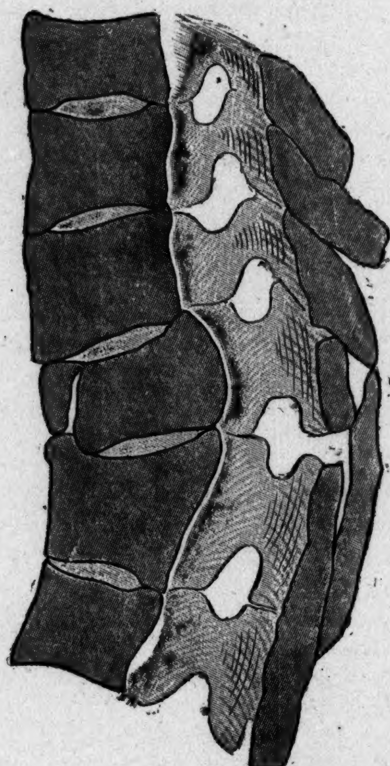


PLATE XIII.

(No. 938 WARREN MUSEUM.)

Fracture 4th dorsal: longitudinal section, showing backward displacement and narrowing of canal. Female, æt. 25; fall, 15 feet; paralysis (complete); bed sores; death, 9 weeks.

with great improvement, he was led to apply a similar treatment to fresh fractures of the spine. He did not advocate its employment in all cases, but in his three cases the results were favorable. (See Appendix II.)

He said that doubtless the method had been employed in other hospitals, and he wrote the paper as a contribution to the subject. Wagner, of Königshutte, reported two cases with which he was not at all satisfied. In both cases he was obliged to remove the jacket. (See Appendix III.) He advised caution in the use of the jacket, had seen it produce paralysis, and felt that the replacement might produce alarming or dangerous symptoms. He advocated its application at the expiration of fourteen days. The whole subject was discussed at the German Congress of Surgeons in 1881,[20] and was evidently considered a measure worthy of trial in picked cases. Langenbeck mentioned a case which he had treated in this manner in 1862, and which ended in failure. Since then I have accounts of the following cases: one by Berkeley Hill (see Appendix IV.); one by Edouard de Reynier (see Appendix V.); one by Carson (see Appendix VI.); two cases by H. O. Marcy, private letter (see Appendix VII.); and the five cases included in Table F.

No attempt has been made to investigate cases where a jacket has been applied after the tenth day following an injury. This gives us sixteen cases, in which three died, three derived no benefit from the method, and ten were greatly benefited.

The subject may be summarized, and I submit the following conclusions:

First—That, in the *immediate* correction of the deformity and fixation with plaster of Paris jacket or other means, we have a rational method of treating a large number of cases of fractures of the spine.

[20] Berl. Klin. Wochen., 1881, p. 247.

Second—That, considering the hopelessness of results in fracture of the spine when treated expectantly, almost any risk is justifiable.

Third—That the *immediate* correction of the deformity is imperative, *if* softening of the cord can and does occur from pressure at the end of forty-eight hours.

Fourth—That the suspension of the patient is only a means of rectifying the deformity; that certain fractures could be simply pressed into position while the patient lies prone or supine.

The objections to the treatment are,—

1st. That the expectant plan of treatment gives a small percentage of recoveries.

2d. That there are serious risks, especially in the cervical region, attending the suspension of a patient and the rectification of the deformity with a fractured spine, in the way of shock, collapse and death.

3d. That in attempting to relieve pressure on the cord, by rectifying the deformity, we might either sever the spinal cord or make pressure upon it. This is a matter of chance.

My own belief regarding the status which the procedure should occupy in Surgery is, that it will occasionally be a life saving measure; that it should be applied under anæsthesia in all cases of fracture of the spine, which are not conclusively known to be irremediable; and that apart from the chance of recovery offered to the patient by this means, it will almost invariably make the patient more comfortable, in that he can be handled more easily.

In conclusion I wish to acknowledge my indebtedness to Drs. H. W. Cushing, E. G. Brackett and W. H. Prescott for valuable assistance rendered in preparing details of this paper.

(Table H.) TABLE OF RECOVERIES.

Number.	Name. Date. Reference.	Age.	Sex.	Surgeon.	Character of Accident.	Seat of Injury.	Crepitus.	Deformity.	Unconsciousness.	Paralysis.	Pain.	Priapism.	Delirium.	Cystitis.	Bed Sores.	Death.	Autopsy.	Remarks.
1	N. K. Jan. 30, 1866, vol. 8, p. 152.	14	F	Coolidge.	Fell 3 weeks before entrance.	Lumbar.		yes										Treatment—rest in bed. Discharged relieved, Feb. 16, 1866.
2	J. R. June 20, 1867, vol. 11, p. 136.	30	M	Cheever.	Fell from mast head.	Fracture of spinous process in lumbar region.		yes		Retention, Constipation.	yes							Discharged well in one month.
3	W. K. Oct. 29, 1870, vol. 32, p. 24.	19	M	Fifield.	Fall from ladder.	1st dorsal.	yes	no	no	Yes.	yes	no	no	no	no	no	no	Discharged Dec. 24, 1870, nearly well; nothing especial done.
4	H. W. Oct. 2, 1874, vol. 53, p. 211.	50	M		Fall 25 feet.	Lower dorsal.	yes	yes	no	Complete.	yes		yes	yes	yes			Some nausea and vomiting; tympanites; paracentesis abdominis; involuntary dejections; bed sores on left flank and thighs, exposing muscles; catheter kept in bladder. Heavy drinker. Discharged relieved, Dec. 30, 1874. No record of paralysis; bed sores clean and small.
5	D. F. Dec. 3, 1874, vol. 55, p. 102.	55	M	Gay.	Buried in débris by giving way of a floor.	Lower dorsal.	yes	yes	no	Complete.	yes			yes	yes			Tympanites; incontinence of urine; diarrhœa; became fretful; circulation poor; no improvement in paralysis. Discharged relieved.
6	J. E. Feb. 26, 1878, vol. 76, p. 130	38	M	Thorndike.	Fell down 4 steps, striking on head and shoulders.	Cervical.	yes	yes	no	Partial, at first.	yes							Paralysis of arm, hand and leg at once, lasting 12 hours; gradual return of sensation; probable fracture of spinous process. Discharged March 23, 1878, relieved.
7	P. W. June 21, 1881, vol. 95, p. 136.	32	M	Ingalls.	5 weeks before entrance fell quite a distance.	Lumbar.		yes		Complete.	yes			yes	yes			Discharged in one month, condition unchanged; incontinence of fæces and urine.
8	F. D. Sept. 2, 1882, vol. 106, p. 221.	34	M	Thorndike.	Fell 2 stories.	Lumbar, 4th.	yes	yes	no	Complete.	yes		no	yes	yes			Tympanites; involuntary dejections; reflexes increased; considerable twitching; "girdle" sensation; urethritis. Treatment, fracture bed. Oct. 14, 1882, motion in legs. Nov. 9th, sat up. Nov. 13, discharged, condition relieved. Seen on Oct. 1, 1886. Staid in house 3 yrs. 8 mos., going about on crutches; retention for 5 mos.; incontinence of fæces 2 years. Present condition—slight incontinence; can go down stairs fairly well with crutches; can move r. leg fairly, but subjectively heavy; almost complete motor paralysis of l. leg; appetite fair; was very fat for a time, now weight nearly normal.
9	T. K. Sept. 13, 882, vol. 108, p. 18.	32	M	Thorndike.	Fell from team, striking on face.	Cervical.	yes	no	no	Absent.	yes							Mounted team and rode home; neck became stiff. Examination—head carried low; crepitus on lateral pressure of transverse processes of 5th & 6th cerv. vert. Sept. 14, 1882, p. of P. jacket, with a hood about head; back fixed with ham splint, attached with shoulder cap over head, after partial removal of plaster. Sept. 29, 1882, "bound to go"; plaster removed; projection felt over 5 & 6 cerv. spines; some tenderness: moves head easily. No further symptoms.
10	R. B. Oct. 5, 1882, vol. 108, p. 87.	29	M	Fifield.	Was caught between the seat of a team and the top of a driveway.	Lumbar, 1st & 2d.	no	yes	no	Absent at first, slight numbness later.	yes							Delirium tremens on 4th day. Discharged Nov. 1, 1882, nearly well; projection plainly felt.
11	S. C. Oct. 5, 1883. vol. 116, p. 92.	33	M	Fifield.	Fell 14 feet, striking head.	Spine of 6th cervical.	yes	no	no	Absent.	yes							Discharged well in 6 weeks; plaster hood applied 3d day. Letter, May 16, 1887, does light work on a farm.
12	M. C. Nov. 23, 1883, vol. 115, p. 165.	40	M	Cheever.	Thrown from a team.	Upper Lumbar.	yes	yes	no	Complete.	yes	no		yes	yes			Dec. 22, 1883, thinks he can do as well at home as in hospital; discharged, own request, unrelieved.
13	W. R. July 7, 1884, vol. 122, p. 159.	45	M	Homans.	Thrown from railroad bridge.	Dorsal, 4th & 5th.	yes	yes	For a few minutes.	Absent.	yes							Lobar pneumonia 36 days after entrance. Treatment—fracture bed, swathe round body. Discharged, well, Aug. 30, 1884. May 18, 1887, walks about, and does a little work.
14																		(See Table for Immediate Rectification of Deformity and Fixation by P. of P. Jacket.)
15	F. W. Sept. 20, 1885, vol. 130, p. 256.	36	M	Bolles.	Fell 3 stories.	Mid-dorsal.	yes	no	no	Complete.	yes			yes	yes			Letter from patient Sept. 15, 1886. Can move legs slightly, but not to any practical extent; sensation fairly good; catheter constantly; scrotum and penis often œdematous; general condition improving, but bed-ridden.
16	W. C. Oct. 18, 1885, vol. 132, p. 66.	25	M	Post.	Fell 35 feet, 1 week before entrance.	Dorsal, 4th.		yes		Complete.	yes			yes	yes			Discharged incurable.
17																		(See Table for Immediate Rectification of Deformity and Fixation by P. of P. Jacket.)
18																		" " " " " " " " " " "

APPENDIX.

I.

From the St. Louis Medical and Surgical Journal.

FRACTURE OF THE SPINE, WITH CASES. By T. R. WEIST, M.D., of Richmond, Indiana, March, 1880, p. 295.

ON June 25, 1879, called to see Mr. B., farmer, æt. 30, whose back, messenger said, "was broken." When accident occurred, he was on top of a load of hay, that was being driven under a shed across which some beams were placed. While passing through, he found that he was likely to be caught by the timbers above. He was sitting on the hay; he threw his body forward and lowered his head; still there was not sufficient room, and the upper part of his shoulder and spine came in contact with the obstruction above, and he was badly crushed. Was unconscious for some time after the accident. There was a serious injury and great deformity of back. A few hours later he was in great agony, complaining of violent pain in his back, and of great difficulty in breathing.

Examination:—Shock, pulse 140, feeble, skin cool and perspiring, resp. 35, difficult; deformity of spine at 9th and 10th dorsal vertebræ. On each side of the spine there was a decided swelling near the point of curvature. On shoulders, skin abraded and much bruised. Loss of sensation below seat of injury, more marked on right than on left side. No paralysis of motion. Slightest movement caused great pain. Spinous process of 9th dorsal vertebra was much displaced backwards, it being possible to place the finger under it. Evidently there was fracture of 9th dorsal vertebra, with slight dislocation backwards. Efforts were made by extension and pressure to reduce the displacement, without success. During these manœuvres distinct bony crepitation was felt. . . . . . Fifteen hours after accident paralysis about the same. He was then suspended à la Sayre. I then made strong extension with slight rotatory movements, and pressure with the other hand over the projecting parts of spine. Crepitation was again felt.

Placter jacket was now hastily but carefully applied, then he was put to bed. Breathing greatly improved; was left in comparative comfort.

Next day he was much improved; sensation below injury restored; bladder again normal. On 7th day he could turn in bed without assistance; on 12th was carried on a stretcher to his father's house 2 miles distant; on 15th day was able to get out of bed himself; on 20th day a new jacket was applied, and worn until September 1st. November 2d, 67 days after accident (?), his back is as strong as before the injury. . . . .

II.

From Centralblatt für Chirurg., Leipzig, 1880, vii. pp. 97–100.

Der Thoraxgipsverband bei Fracturen der Wirbelsäule, von Prof. König. (3 cases.)

(1) Male, æt 20. Had a fall from second story window, Aug. 14th, 1879 ; unconscious when found. Rallied at hospital. On examin., found a fracture of the 8th dorsal vertebra; there were no symptoms of motor paralysis, no paralysis of either bladder or rectum. On Aug. 16th the plaster of Paris jacket was applied, patient being suspended; the jacket extended from the axillæ to the trochanters. The suspension and application of bandage were well borne, and immediate improvement followed. Patient was able to walk at the end of three weeks. On the removal of bandage, about the middle of the following September, deformity had disappeared, and there were no symptoms of compression of the spinal cord.

(2) Patient, male, æt. 28. Had a fall of 40 feet, Oct. 21, 1879; was unconscious for half an hour, then complained of violent pains in back, and formication in lower extremities, with numbness; no paralysis of bladder or rectum. Back very sensitive in region of first dorsal vertebra; angular deformity at that joint.

Oct. 22d, the gypsum bandage was applied, in the same manner as in the preceding case. The nervous phenomena had disappeared by the next day, and the patient was able to move about by the 22d of November. Nov. 29th bandage was removed; the cyphosis had disappeared, and patient was dismissed perfectly well.

(3) Male, æt. 38. Had a severe fall, Nov. 28th, 1879, from roof of a rail-road car; suffered fracture of 8th, 9th and 10th rib, near vertebral insertion, with hæmo-pneumo-thorax deformity (gibbosity) in back, corresponding to the 9th and 10th dorsal

vertebra. On account of symptoms of embarrassed respiration, the correction of this deformity had to be abandoned. Cervical neuralgia. When the symptoms of embarrassed respiration had about disappeared, the gypsum corset was applied, as in the preceding cases. Nervous phenomena had disappeared the next day; patient continued to improve, and by the end of the year had perfectly recovered.

In all these cases recent fractures were dealt with, and only in such cases would I recommend the application of the gypsum corset.

III.

From Centralblatt für Chir., Leipzig, 1880, vii. pp. 737-739.

Zur Behandlung der Fracturen der Wirbelsäule mit dem Sagreé schen Gipskorsett, von W. Wagner. (2 cases.)

The author refers to the good results obtained by Prof. König in his 3 cases, and then reports two cases with which he is not satisfied:—

(1) Male, æt. 38. On Oct. 16th, 1879, was buried beneath a mass of coal, which fell upon his back; was immediately removed to hospital. There was evidently fracture of the 11th dorsal vertebra. Paralysis of bladder, which was temporary, and disappeared within 24 hours; no motor or sensory disturbances; "gibbosity," or displacement of fragments, in back. The next day patient was suspended "to toes only" (!); the "gibbosity" disappeared somewhat, but the patient complained of violent pains near the seat of fracture during the suspension. The plaster of Paris jacket was applied. During the next twenty-four hours, the pain had so greatly increased, that the patient was actually frenzied, so that the bandage had to be removed, when the pains immediately abated, and the patient afterwards recovered.

(2) Male, æt. 25. Jan. 31, 1879, sustained a great pressure while in a bent position; fracture of the 10th dorsal vertebra; no disturbance of mobility; deformity in back.

The plaster of Paris jacket was applied 24 hours after reception of injury, and was well borne at first; deformity disappeared; no increase of pain. The next day the patient complained of numbness in his lower extremities; when examined, perfect paralysis of extremities was found, also paralysis of bladder, necessitating use of catheter; decreased sensibility of extremities also found. The bandage was at once removed; all the disturbances mentioned disappeared in the course of a week. At the end of that time, patient complained of severe pains at seat of fracture when he attempted to sit up in bed. Another bandage was applied; this was worn for three months, when the patient was dismissed with slight deformity.

IV.

From Transactions of Clinical Society of London, 1881, vol. xiv. pp. 144–147.

Case of Berkeley Hill, read March 11th, 1881, before Clinical Society of London.

John Richards, on Dec. 1st, 1880, fell 20 feet down an elevator. He was unconscious until he found himself in the hospital. On his way to Univ. College Hosp. he had two fits. Never remembers having any before the accident. Suffered for 24 hours from concussion of brain and spinal cord, and was unconscious for half an hour after admitted to the hospital. Pupils dilated and insensible to light; skin hot and sweaty; pulse 120. Respiration frequent, shallow and puffing. A severe contusion behind the right parietal eminence was the only sign of injury to skull.

In the back, there was prominence of the spinous processes from the 10th dorsal to 2d lumbar vertebra; a large swelling occupied the vertebral grooves. No symptoms of visceral injury; urine drawn from bladder, normal; no paralysis of lower extremities, but great pain on movement. At 7 A.M., next day, temperature 103°; no retention of urine, no paralysis, but great pain in back. At 2 P.M., same day, the jacket (plaster of Paris) was applied; it gave great pain until it had firmly set; patient was kept until then on air-bed. The temperature then fell, patient asked for food, and then slept. Third day after application of jacket patient could roll himself in bed from side to side without pain.

Dec. 4th, patient complained of sharp pain on dorsum of left foot; no loss of sensibility anywhere. Dec. 5th, could not move the lower extremity at hip, knee or ankle, though he could flex the toes slightly. Right limb normal; but sensation of "pins and needles" in fingers of right hand. In two days control of left limb was regained, hyperæsth. of foot disappeared. Jan. 27th, jacket removed, patient allowed to walk about the ward. Feb. 2d, patient left for Eastbourne Hospital (a long railway ride). Feb. 24th, completely cured and able to walk three (3) miles.

V.

From Deutsche Z'schrift. f. Chirur., Leipzig, 1885, xxii. pp. 356, 386, by Edward de Reynier.

Fracture of 7th Dorsal Vertebra.

Patient was suspended "à la Sayre;" perfect reduction of dislocation in this position; plaster of Paris jacket was then applied, in order to insure "permanent reposition" of spine.

The injury had caused paralysis both of motion and sensation in lower extremities, which had completely disappeared eight days after application of jacket. One month later patient was able to rise and walk, with the aid of crutches. He wore the jacket for two months, at the expiration of which he left the hospital cured.

Title of article is: *Einige Bemerküngen über* 17 *Falle von Wirbelfracturen, die auf der Chir. Klinik zu Bern vom Jahre,* 1865–1884 vorgekommen sind, von EDOUARD DE REYNIER.

Patient, male, æt. 19. Admitted to hospital, Sept. 20th, 1881, for fracture of spine (exact location not mentioned); had fallen into a well head first, had his back suddenly thrust backward; states he "heard his back crack." He was then unable to rise or move and was brought to the hospital in this condition. Author regrets to say that he was only thoroughly examined five days after the infliction of the injury. Plaster jacket was not applied until Oct. 3d; the next day the sensibility and power of motion had returned, and retention of urine disappeared (no priapism).

VI.

From St. Louis Courier of Medicine, Jan. 1885, p. 71.

Meeting of "St. Louis Medico-Chirurgical Society." Dr. Carson (N. B.); "It may be interesting to the gentlemen here who were present several weeks ago, when I reported a case of fracture of the spine, to hear the result. I saw the patient shortly after the receipt of the injury, within a very few hours, and applied a plaster jacket; the patient was at that time devoid of sensibility and ability to move the extremities. I stated that immediately after the stretching he felt relieved from the pain, and all the other symptoms were also relieved; the fracture was in the lower portion of the dorsal region. The patient gradually recovered, and the bad symptoms disappeared within a few days after the application of the splint, as did the other disagreeable symptoms, and he said to me to-day that he felt as though he could go out. I don't think he could run a race, but I think he has done very well indeed.

We have had, since that time, another case, which happened very much in the same manner, and the injury is very nearly at the same site. The patient came to the hospital several days after the injury was received, in a much worse condition. We applied the jacket in this case, but not with any decided improvement, so far. The patient was unable to talk or feel the introduction of the catheter at the time he entered the hospital. At

the present time, whenever the catheter is introduced, he feels it, but there is total loss of sensation in the lower extremities, and his condition is not a favorable one, nor has there been any material benefit by the application of the splint. In this case, however, we did not suspend him as we did in the other; we tried extension and counter-extension from the hip and shoulder in the horizontal position."

VII.

W. L., æt. about 50. Carpenter, strong and vigorous. Fell from staging, about thirty feet, May 21, 1881.

Was doubled up and taken home in a hack. I saw him soon after. Fracture of spine near middle dorsal. Paralysis complete. Priapism, retention of urine. Motion of fragments marked at point of injury. After a careful explanation of the danger, extension was made and a plaster splint applied, aided by Dr. Samuel N. Nelson. For a few days there was a marked improvement, both sensation and motion in a slight degree returning to both extremities. Soon the patient grew worse, with rapid pulse, elevation of temperature, delirium, sinking into a coma, and death supervened June 4th, fourteen days after the injury.

Autopsy showed a transverse fracture through the body of the vertebra with local softening of the cord at the place of injury. The fragments were in direct apposition.

Case 2d.—P. R., horse doctor, æt. about 50. In good general health, except suffering from multiple strictures. Had been a hard drinker.

In August of 1882, was thrown backward from carriage, striking violently on shoulders. Paralysis not complete. Sensation and motion of lower extremities, to a limited extent; retention of urine. Not seen for some days after injury, owing to absence from city; under care of another physician. Was a distinct projection with marked tenderness over the second and third dorsal vertebræ, with slight motion on firm pressure. In consultation with Dr. F. A. Holt, of Cambridge, it was determined to attempt extension and reduction, after a careful explanation, of the condition and its danger, to the patient.

Upon extension a certain amount of displacement was effected and a plaster splint applied. The patient fainted, with entire loss of consciousness at its completion, but rallied at once upon being placed horizontal on a water bed near at hand. Owing to pressure and disturbed respiration the splint was carefully opened anteriorly, and retained by tapes. Was kept on water bed three

weeks, and then carefully removed to a firm hair mattress. Paralysis slowly lessened, until patient could walk, at the end of about six months. Now is able to attend to business. Can stand upon either foot and has no pain or tenderness at seat of injury. The patient is stooped, with a considerable prominence at site of injury, and carries the head somewhat forward.

APPENDIX TO CATALOGUE OF 1887.

Fellows admitted since June 7, 1887.

1887	Austin, Arthur Everett - -	Dorchester.
1888	Babcock, James Woods - -	Somerville.
1888	Baldwin, Frederic William - -	Danvers.
1887	Bechtinger, Josef - - -	Boston.
1888	Blair, Arthur Walter - - -	Dorchester.
1887	Bowen, John Templeton - -	Boston.
1887	Brennan, John Joseph - - -	Worcester.
1887	Bryant, William Sohier - -	Boston.
1888	Bunker, Frederic Story - -	Boston.
1888	Cilley, Daniel Plummer, Jr. -	Westboro'.
1888	Clarke, Israel James - - -	Haverhill.
1887	Cochrane, John - - - -	Lowell.
1887	Cogan, Joseph Ambrose - -	Brighton.
1888	Copp, Owen - - - - -	Taunton.
1887	Cowles, William Norman - -	Ayer.
1887	Curtis, Francis George - -	Newton Centre.
1887	Cutts, Harry Madison - -	Brookline.
1888	Davis, Ella Maxfield - - -	Holyoke.
1887	Donovan, Benedict - - -	Brockton.
1887	Dow, Edmund Scott - - -	Allston.
1888	Dunne, Alexander John - -	Springfield.
1887	Earle, Bessie Cornelia - -	Worcester.
1887	Ehrlich, Henry - - - -	Boston.
1887	Fox, William Yale - - -	Boston.
1887	Francis, George Hills - - -	Brookline.
1887	Francis, Richard Pearce - -	Boston.
1888	Gallison, Ambrose John - -	Franklin.
1887	Gillespie, John - - - -	Roxbury.
1887	Gilman, Warren Randall - -	Boston.
1888	Gould, Clarke Storer - - -	Maynard.
1887	Greene, Edward Miller - -	Boston.
1887	Greene, Ray Woodville - -	Worcester.
1887	Harkins, Daniel Stanislaus - -	Boston.

1887	Hayes, Thomas Joseph - -	Beverly.
1888	Hoadley, Alfred Henry - -	Northampton.
1888	Howe, Elsie Brewster - - -	Boston.
1888	Hunting, Nathaniel Stevens -	Boston.
1888	Hurd, Kate Campbell - - -	Newburyport.
1888	Hurley, Daniel Bartholomew -	Arlington.
1887	Jack, Edwin Everett - - -	Boston.
1888	Jacobs, Henry Barton - -	Boston.
1887	Jones, Gilbert Norris - - -	Boston.
1887	Kelley, Michael Joseph - -	Watertown.
1888	Kennedy, Catherine Moloney -	Springfield.
1887	Libby, George Wesley Harding -	Worcester.
1888	Locke, Horace Mann - - -	Somerville.
1888	Lumbard, John Patrick - -	Dorchester.
1887	Lyon, Arthur Vinal - - -	Brockton.
1887	Macdonald, Colin William - -	Roxbury.
1887	Mahoney, John Bernard - -	Malden.
1888	Mansfield, Francis - - -	Taunton.
1887	Maynard-Bellerose, Joseph H -	Worcester.
1888	McNally, William Joseph - -	Charlestown.
1887	Morrison, William Alexander -	Boston.
1887	Morse, Frank Adelbert - -	Lynn.
1887	Nash, George William - -	Ottawa, Kan.
1887	Newton, Edward Cazneau - -	Provincetown.
1887	Noble, Alfred Ira - - -	Worcester.
1887	Norton, Eliza B Lawrence - -	Walpole.
1887	Nottage, Herbert Percy - -	Chelsea.
1887	O'Donnell, Francis Michael -	Newton.
1887	Palmer, Sarah Ellen - - -	Boston.
1887	Parks, Silas Henry - - -	Great Barrington.
1888	Parsons, Ralph Alfred - -	West Roxbury.
1887	Patten, Julia Maria - - -	Holyoke.
1887	Paul, Walter Everard - - -	Boston.
1887	Peirce, Charles John - - -	Shirley Village.
1887	Phippen, Hardy - - - -	Salem.
1887	Sears, Henry Francis - - -	Boston.
1888	Sheedy, Daniel Michael - -	Northampton.
1887	Simons, Thomas Gaff - - -	Springfield.
1887	Smith, James Frederick - -	Westford.
1887	Soules, Silas George - - -	Hudson.
1887	Sprague, Phebe Ann - - -	Springfield.
1887	Stearns, Charles Goddard - -	Leicester.
1887	Stone, Arthur Kingsbury - -	Boston.
1887	Thorndike, Augustus - - -	Boston.
1887	Thorndike, Paul - - - -	Boston.
1888	Trevino, Manuel Francisco - -	Boston.
1887	Tuck, Lorenzo Wadsworth - -	Boston.

1887	Tuttle, Albert Henry - - -	Cambridgeport.
1887	Walker, John Baldwin - -	Boston.
1888	Webster, George Arthur - -	Boston.
1887	Whittier, Francis Fremont - -	Brookline.
1887	Williams, Henry Clarence - -	Melrose.
1887	Woodbridge, Luther Dane - -	Williamstown.
1888	Worcester, Charles Pomeroy -	Boston.
1887	Zabriskie, Frank Hunter - -	Greenfield.

List of Deceased Fellows.

Admitted.	Name.	Residence.	Date of Death.	Age.
1866	Allen, George Otis	West Roxbury	Oct. 3, 1887	48
1837	Atwood, George	Fairhaven	Jan. 16, 1888	72
1883	Bagg, John Sullivan	Springfield	July 9, 1887	38
1879	Bennett, Luther William	Boston	Jan. 4, 1888	37
1851	Clarke, Rowse Reynolds	Whitinsville	Feb. 4, 1888	65
1850	Cross, Enoch	Newburyport	May 17, 1888	86
1850	Dana, David	Lawrence	Dec. 10, 1887	64
1847	Drake, Ebenezer Wade	Middleboro'	June 28, 1887	69
1860	French, John Odoway	Hanover	Sept. 28, 1887	65
1875	Hackett, Charles Warren	Maplewood	June 30, 1887	35
1869	Heath, Charles Edmund	Lee	Oct. 5, 1887	56
1846	Jones, George Stevens	Boston	Feb. 2, 1888	70
1872	McArthur, John Ambrose	Lynn	Sept. 28, 1887	56
1875	McGowan, Charles Edward	South Boston	Nov. 12, 1887	36
1888	Mullen, Francis Henry	Dorchester	Mar. 15, 1888	31
1867	Nichols, James Robinson	Haverhill	Jan. 2, 1888	68
1840	Parker, David McCaire	Boston	Oct. 8, 1887	71
1861	*Parker, Peter	Washington, D.C.	Jan. 10, 1888	83
1866	Priest, George Arthur	Manchester	April 25, 1888	59
1853	Smith, John Manchester	Vineyard Haven	Dec. 15, 1887	61
1865	Smith, Norman	Groton	May 24, 1888	76
1846	Spalding, Joel	Lowell	Jan. 30, 1888	68
1857	Spring, Charles Harrison	Boston	Dec. 9, 1887	55
1847	Stickney, Pierre LeBreton	Springfield	Nov. 5, 1887	73
1887	Swallow, Edward Emerson	Waltham	Dec. 31, 1887	34
1854	Tanner, Nelson Briggs	North Abington	Nov. 25, 1887	70
1880	Totten, John Edmund	Attleboro'	Nov. 3, 1887	37
1855	Trow, Nathaniel Gilman	Sunderland	Feb. 4, 1888	76
1837	Ware, Charles Eliot	Boston	Sept. 3, 1887	73
1860	Warren, Charles	Wellesley Hills	Jan. 31, 1888	73
1878	Waterman, James Henry	Westfield	Nov. 23, 1887	51
1886	Wellington, Charles Berwick	Cambridgeport	Feb. 17, 1888	28
1838	Wilde, James	Duxbury	Oct. 15, 1887	74

* Honorary.

The following have been restored to Fellowship:

Whitmell Pugh Small, of Great Barrington.
Frederic James Sanborn, of Spencer.
James Orne Whitney, of Pawtucket, R. I.

The following have been allowed to resign:

F. Dillon Brown, of New York, N. Y.
George T. Chase, of New York, N. Y.
Charles W. Harwood, of Saco, Me.
Edward F. Hodges, of Indianapolis, Ind.
Flaville W. Kyle, of Raton, New Mex.
Hannah L. Nichols, of Thompson, Ill.
John C. Pennington, of Colorado Springs, Col.
George W. Perkins, of Omaha, Neb.
Arthur C. Pierce, of Corpus Christi, Texas.
Asbury G. Smith, of Cincinnati, Ohio.
Charles E. Taft, of Hartford, Conn.
Flavel S. Thomas, of Hanson.
Herbert B. Whitney, of Salida, Col.
George A. Willey, of Oxford.
Charles H. Williams, of Chicago, Ill.

The following was dropped from the roll, having forfeited membership by removal from the State and non-payment of dues:

Frank H. Daniels, of New York, N. Y.

The following were dropped from the roll for non-payment of dues:

Charles H. Crawford, of Hollister, Cal.
Eliphalet Wright, of Lee.

The following have become retired members:

Franklin Bonney, of Hadley.
William Dwight, of North Amherst.
Daniel V. Folts, of East Boston.
William Mack, of Salem.
Miles Spaulding, of Groton.
Joseph H. Streeter, of Roxbury.
Ephraim L. Warren, of Melrose.
Royal S. Warren, of Colorado Springs, Col.

ARTICLE X.

THE ANNUAL DISCOURSE.

RE-ESTABLISHMENT OF THE MEDICAL PROFESSION.

BY B. JOY JEFFRIES, M.D.
OF BOSTON.

DELIVERED JUNE 13, 1888.

RE-ESTABLISHMENT OF THE MEDICAL PROFESSION.

Mr. President and Fellows
of the Massachusetts Medical Society:

It is very generally agreed that the lawyer, the minister, the squire, and the physician, do not hold the same relation to the community as they formerly did. As that position was one of trust and confidence, it well behooves us to carefully study the causes that have broken it down, and correct if possible any fault lying at our door. On the other hand it is equally our duty to right ourselves before the community, if our efforts have again placed us in a position to be trusted and confided in. Moreover, if the community misjudge the whole from a part of the profession, it is the duty of those truthfully striving, not to have their labors misjudged and injured by any false sentiment towards others not so acting.

There are of course many natural causes for the three professions not holding their ancient

---

Note.—At an Adjourned Meeting of the Mass. Medical Society, held Oct. 3, 1860, it was

Resolved, "That the Massachusetts Medical Society hereby declares that it does not consider itself as having endorsed or censured the opinions in former published Annual Discourses, nor will it hold itself responsible for any opinions or sentiments advanced in any future similar discourses."

Resolved, "That the Committee on Publication be directed to print a statement to that effect at the commencement of each Annual Discourse which may hereafter be published."

position. They are now but three of many existing in the world. Science and art and technology have introduced distinctly professional fields of study and occupation.

In the older compact and more isolated communities the diffusion of knowledge was less. The three professions represented nearly the whole of it. Moreover the diffusion of falsehood was less, though credulity remained. All forms of medical chicanery have increased and widened with the means of reaching by the public press and the post office a larger circle of the ignorant and credulous, poor and rich. Wealth does not now as formerly include knowledge and common sense. Money is more easily gathered than knowledge, and its accumulation does not preclude the continuance of its owner's previous credulity or gulliblity. Moreover money renders its sudden possessor more dogmatic in his superstition and infallibility. The poor man is open to teaching and advice, the rich man thinks that his wealth places him above both of these.

In the village life of former days any question of medicine, natural science or natural philosophy was referred to the physician, and his decision taken. The common sense imbibed in medical education and practice enabled him to expose the falsehood started by cupidity and kept alive by credulity. The same confidence was reposed in the minister as to all matters of morality or theology, and in the lawyer as to property and legislation. But we are not concerned with them.

Our own position alone should occupy our thoughts and efforts.

Why have the profession as a whole lost their hold on the community and the respect naturally theirs? In this country democracy has brushed away any glamour of office, all that which hedges in a class or an organization. Even that which clings longest, namely any peculiarity of manner or dress which separated us from others, has melted away before the sun of common sense and general intelligence. When the physician possessed more knowledge, more education than those about him in his community, he was respected for these as he should have been. But now-a-days those about him have in the general advance of education gained upon and only too often outstripped him. In the struggle for existence the doctor goes to the level that he is entitled to by his education and the refinement this gives him. If the ranks are filled with men without education, except that which they are supposed to have medically, then the laity finding that such are destitute of the former, very fairly doubt the existence of the latter. Good breeding and a good education are not now as formerly the natural attributes of those legalized by a diploma. Cheap and charity medical schools have multiplied over our country to a greater extent even than seminaries, colleges and so-called universities. The profession well know that these medical schools are but local advertisements, and that in their struggle for existence they underbid each other, not only as to

medical education, but also receive as students and give medical degrees to men comparatively destitute of even a common education. The various state legislatures grant these medical schools the power to issue such degrees, which the laity ignorantly accept as a proof of education, and that is what they are sold and bought for.

Now in course of time the laity have found out that the holding of a medical degree, being a doctor, does not preclude ill breeding and lack of education. And they have naturally arrived at the conclusion that a medical man may be pretty low in the social scale gauged by education, hence that the study and practice of medicine mean but little.

To give every individual in the community without respect to color or sex an opportunity for the best education he can attain to and his ability deserves, is a noble charity on the part of the state or the private citizen. For the public or private institution to sanction by its seal ignorance and quackery in any form, is simply cheating the community for the moneyed benefit of the few and unworthy. The poor and unlearned are deluded by the title of doctor, and the delusion has the sanction of the state by the judge on the bench deciding that one medical degree is as good legally as another. The laity know nothing of and cannot judge medical matters, and hence are easily duped into giving state sanction to any and every form of rascality under the guise of medical teaching, from a Druid college to a Christian Scientist's

bucket shop, thus helping to fill our grave yards and insane asylums. The community demands protection in everything except precisely where it needs it, namely from ignorance, prejudice and superstition.

It is from such causes it seems to me that the medical profession as a whole has dropped in the social and educational scale, lost power and lost influence. The public recognize that it is largely entered into as a trade or business, and that many of its members hold degrees and diplomas purchased of the mills, legalized it is true. But so are the dram shop and saloon legalized. The professors in our law schools well impress on their students that law has nothing to do with justice. One doctor is the same as another to the public, to such an extent that even men of attainment and culture fail to distinguish the honorable and well-educated physician from the quack and the charlatan.

I have found many truly scientific men treating us most unfairly in this respect. They tolerate licensed or unlicensed pretenders in medicine without separating them from those of the profession whose knowledge and proved ability really place them on an equality with themselves. They give credence to and put faith in, associate with, men whose ignorance, charlatanism and want of breeding are such as they never would admit them in their own field of study. Men of science in other branches receive from no class greater recognition and respect than from the best men in

our profession, who know enough to appreciate knowledge and its attainment. It is but fair that we ask of them such discrimination as they employ towards each other, and not attribute any protest on our part to narrowness, professional jealousy, etc. It can only be that they as members of the laity imbibe prejudice from inability to discern and judge of medical matters.

The teachers and the examiners in the best Medical Schools all over the world are demanding greater educational requirements of men desiring to study medicine. And this most rightly, because it is impossible to teach medicine to those without thorough foundation. They cannot learn, and to give them diplomas half earned, but adds to the load the educated portion of the profession have to carry. The refinement which education gives is needed in the practice of medicine. Education of a high standard is needed for the doctor to hold his proper relations to the community, besides a thorough knowledge in his calling.

Medicine can only recover its former just position when the world is forced by its existence to recognize that to be a graduate of a good medical school means to have the education of our best universities in addition. The world will not now believe and trust in a man's medical knowledge unless they have proof of other education besides, which adds force and power and refinement. The doctor must be, can be, and will be, a man of science. As such we can ally ourselves with the great body of men striving for knowledge and seeking truth.

From the lack of this, a large part of our profession is not distinguishable from the man of business or the tradesman, perhaps perfectly respectable, but perfectly commonplace, and worthy only of the position trade and business take in the community.

The avenues to wealth or official power are quite outside our calling. As physicians we cannot compete with trade or business. But this is our common lot with other scientific men. Wealth is a mighty power, but it falls palsied before knowledge. Slowly but surely, I believe, is the former yielding place and respect to the latter. Certainly Crœsus is never more flattered than when treated as possessing knowledge, education and the refinement it brings.

Are we not in honor bound to do all in our power to bring up the standard of education and the standard of professional requirements in our calling? Educators tell us that it would be a good thing for the world if nine-tenths of our so-called academies and little colleges were swept away and merged in large and strong institutions. Certainly it would be a good thing for the world and for our profession if nine tenths of the medical colleges were swept away, and what was good in them gathered into a few great medical universities, placed where teaching and study could best be carried out.

Why should not this Society quickly raise its standard of requirement for admittance, such as would render membership a proof of educational refinement and professional knowledge? I grant

you that moral courage and backbone are needed to do this. But I insist that the possessors of these exist among us, and await only support from the majority. Let them have it, and this at once, or else the best men in the profession must separate and form themselves into a body known and respected for possessing what the others do not. May this necessity never come in my day. But we must sympathize with the man of scientific attainment and educational refinement forced to recognize another who is ill-bred and half-educated, simply because the latter holds also a medical degree which insures nothing of these. That is trades union.

I hear expediency, desire to conciliate for ultimate purposes, compromise, saying, perhaps with bated breath, we cannot be so high toned, we cannot expect doctors to have the refinement of education, or more professional knowledge than enough to get along in practice. I answer at once, with no hesitation or reservation, that there is an increasing number of men in our ranks who have educational refinement and high professional attainments.

Again I hear it said that the requirements of a physician's vocation tend to break down his literary life and hinder any advance in his medical study. This is but an attempted defence of the ignorant who never should have been allowed to enter our ranks, and who have done so for trade through chicanery. No one of the laity has to descend to the low offices the sacred duty of a physician calls

upon him to perform for his patient. Such never detract from his refinement or his dignity. Circumstances may call upon us at times to do any manual or menial work. We elevate it, not degrade ourselves, by performing it as a part of the burden we assume with our title. There is nothing demeaning in taking care of your horse, your furnace or your boots; there is, in saying "I be," and in calling yourself an "allopath."

A knowledge of the formation and working of the human frame, so called anatomy and physiology, the recognition of the diseases incident to humanity, the control of these latter by hygienic methods, drugs or surgical interference, are what separate our profession from the rest of the community. We are a very distinct class, wholly apart from the rest of our fellowmen who have gained or who are pursuing knowledge. Any intelligent person in proportion to his intelligence or capacity, may have *some* ideas of justice or injustice which we call law, of right or wrong which we call morality or theology, or of the great principles of the other professions now recognized. But no man or woman, no matter how intelligent, can make any truthful decision as to our bodies in health or disease, or how the latter may be prevented or mitigated by any human means. It is only the very shrewd among the laity who recognize and act on this. I do not mean the blind trust of the ignorant and credulous or superstitious.

The great mass of the laity feel perfectly competent to judge of medical matters as they do of

other things, where there is seeming cause and effect. They feel as if it was an insult to their common sense and discernment, not to be able to instantly judge, where we with all our knowledge and experience feel still incompetent to decide the present or the future. They regard the cautious safety in which we feel our way, as only a proof of ignorance or incapacity, referring to the glib answer they get from the charlatan in support of their opinion. Nothing irritates men or women of the laity more than to have their medical judgment shown up to them as silly credulities. They stand by these, and the quack who has induced them, the firmer the more they have been deceived. The greater the knowledge and education or even the scientific attainments, the more firmly will the laity feel assured of their capacity of judging things medical, and resent exposure of their special fad. In their own department of learning or research they would derisively laugh at any one arguing from such evidence as they have accepted without challenge in matters medical.

I have often shown a business man to what silly credulity he has yielded in what concerned his own life and health, or that of those he loved best. And I have asked him what would be his position if he yielded to such charlatanism in his business and every-day life, acted on such evidence, and adhered to such falsehood. Many such a man has afterwards thanked me for the new thoughts I had given him, and the warnings to balance evidence with common sense and applied intelligence.

Human nature is such that you often cannot argue with or convince it. But human nature is very sensitive to being proved silly, or even credulous. Nothing is more powerful than the exciting a smile at an opponent's expense. Now when physicians meet in social intercourse with each other, what for them is more entertaining or affords greater amusement than the relation of their individual personal daily experience of the laity's medical ignorance and hence medical credulity? No matter how great the rascality of the special quack or charlatan in question, he will not be inveighed against, the laugh is always at the expense of the dupe, the greater whose intelligence the greater his silliness of action. There is no more complete satire on humanity than just this never ceasing fund of entertainment the laity of all classes afford us. Could the public hear and understand our collected knowledge of this folly, their ears would tingle, and if shrewd enough they might profit by it. But the tailless fox, even with an unhealed stump, will recommend the trap to his friends. None know this better than the quacks and charlatans. The laughter we enjoy at the laity's expense is a bitter medicine for them, but when judiciously administered may often be of great benefit. Its exhibition requires tact and moral courage. The "paths" who fatten on the laity's medical credulity never offend the laity's belief in the infallibility of its judgment, for this would soon affect their pockets. The "paths" pretend to be doctors; the pretence satisfies the laity.

Our profession know only too well that there is no limit to human gullibility in all matters medical. High and low, rich and poor, ignorant and learned alike are human in all that relates to their bodies, and hence gullible, credulous and superstitious. Now it requires very little brain-power to fool those who know nothing of the subject concerning which they are being fooled, and who are *willing* dupes. The ignorant laity will swallow anything mentally and physically, and so will the intelligent and the learned if you only favor their conceit of knowing more of our profession than we do ourselves. This is the secret of the various pathic-quacks' success.

The community never challenges the charlatan's knowledge or ability whilst accepting his statements. To be a quack doctor is the easiest thing in the world; requires but little sharpness. The most successful medical pretenders could not earn their salt in any business pursued by their clients.

All this proves that the whole laity are but a parcel of children in their relation to us, destitute of discernment, ability to discriminate, power of observation and deduction. A man or woman in bodily pain or fear, or seeing those they love so, is wholly without mental balance and seems to lack at times even common sense. Very little sharpness is then needed to prey upon human weakness. The subsequent shame of having been preyed upon when the quack is exposed, but renders the latter's dupe his strongest defender. The laity always have resented and always will furiously

resent being considered what the intelligent and educated physician knows they are, from that knowledge which he has and they have not.

Shall we simply avail ourselves for gain of the laity's ignorance of the subjects we are familiar with, their passions, prejudices, superstitions and unfathomable credulity? Is it not dishonest to do so, what in business is called sharpness? We may have to bow before our patient's knowledge or scientific standing, but real or unreal pain or fear will readily make him bend the knee to our true or supposed superior position. Shall we take advantage of his condition? Why not, says the doctor whose profession is a trade; why not, says the sharp business man, it is perfectly legal. But law is not honor or justice. It is *our* duty, a part of the work of *our* life, to protect the community, to resist quackery, by always and at all times unmasking it, firmly, fearlessly, earnestly.

Men and women are attracted to this or that quack by the special "pathy" he pretends, and in belief that the quack applies the special pathy to his or her case. A man goes to a gambling hell in the belief that he is to play at a game of chance, and will excuse himself on this. The societies who are fighting these dens show up their methods, and prove to their patrons that it is not a game of *chance*, but a game of *cheat*,—not the accidental turning of a card or rolling of a ball, but that these are turned or rolled by the gambler to fleece his victim. Now why not be perfectly straightforward and honest, and have moral courage enough

to plainly tell the community the truth, namely, that there is no such thing as a "pathy," that there is no true homœopath, that men merely call themselves that or other things simply for gain? If you, as can so readily be done, show your client that the quack to whom he is attracted by any special pretence does not even practise *that*, you will help save him and the community from fraud.

We know that this is perfectly true, and we are in a position to know whilst the laity are not. Do we not fail in our duty in letting them be deceived? Does not our silence and hence seeming acquiescence arise from motives which will not always bear the light? I am afraid that our so-called desire not to make martyrs of them does not always arise from simple prudence. Is it not rather a shrinking from offending our patrons and wounding their self-conceit and their misjudgment of things medical? *We* know all about the quack and pretender, licensed or unlicensed, and we simply assist his cheating the community, become *particeps criminis*, by in any way *seeming* even to recognize him professionally or socially.

One has heard in the past a great deal about physicians by their exposing and opposing quacks only inducing the laity to protect and patronize them as injured beings. Time has wholly convinced me that the laity only regard our tolerance and forbearance as proofs of our ignorance and wrong position, and whenever, as is not infrequently the case, they learn of the true condition of affairs, simply despise us for want of courage

and ability to hold our own. Professional intercourse with quacks of any kind is foolish, and is sure to react upon the one who attempts it, whatever his motives. Indeed such professional or social intercourse is worse than folly. It is of no use to beat about the bush. We know perfectly well that these men, no matter what their so-called standing in the community or number of dupes as patients, are cheating those confiding in them, not even following their pathy, as their clients believe, but simply doing what will draw from the pockets of the latter. How can you socially or professionally recognize such men and women without helping them defraud the laity, whilst you finally but receive the latter's contempt as your reward.

Next to honesty, moral courage pays best in this world in the long run. I am sore afraid that the community lose and the quack gains by the lack of it in our profession, where if anywhere it ought to be found, and where most certain final failure follows its absence. I mean true moral courage, and not an assumed bluntness or brass too often found in imitation of it. Shrinking from one's duty in exposing pretence to defend our patients and their surroundings from chicanery, is timidly called necessary expediency. The charlatan laughs at us for it, and the laity, when they sooner or later find it out, join in the laugh.

We do no good in demeaning our profession. Even if our motives were good in semi-recognition professionally or socially of quack pathies, the community would not give us the credit of such

motives. When a quack's dupe has unearthed the rascality, his reaction is pretty violent; and if the physician, by action or inaction, has seemingly helped the rascality, he will come in for his share of the blame and be heartily despised.

I have heard it argued in the past, that the various pathies in medicine, which follow one another in time, have from the ignorance of the laity gained such a hold that it is better policy to compromise with them, and seemingly recognize them, although they are pursued simply and solely because they are an easy means of getting money from dupes. Moreover, that these dupes are often the highest and most talented in the land, *hence* those who cheat them must be respected by us. Why not respect the gambler and bunco-steerer, because his dupes are often the highest and supposed best in the land? No, our study of medicine teaches us the truth, which the laity cannot understand without the same study. To deny or act contrary to this truth is a falsehood, whether you call it expediency, compromise, or a pharisaical desire to live at peace with all.

One of the worst features and most dangerous tendencies of this very community is the desire to compromise, which is generally the combining the wrong of both sides, each party giving up what it knows is right and true. I have often received friendly hints and chides for uncompromising opposition to medical quackery in the licensed and unlicensed. I can now look back with pleasure to not having yielded to these, but

followed my own instincts and belief in my position of hatred for and determined fighting against every pretender, and in never hesitating to express to his dupes the exact truth, whether pleasant or unpleasant for me or them. I have lived to see, my enthusiasm if you will, honesty and fidelity to the profession surely, recognized by and respect wrung from these very pretenders themselves, as proved by their sending their clients to me.

Certainly honesty is the best policy, however low that is as a reason for right action. If we make quacks respect us, the community certainly will also, and we shall thus raise our profession to where it belongs before the world.

I am sorry to see a desire and willingness to meet quacks and argue about quackery, as if this was absence of supposed professional jealousy, and showed a broader and more catholic spirit. Do the physicians who would do this know how the quacks laugh at them and despise them for it? A quack doctor knows he is such, and counts you a fool if you don't know and can't detect it, but he will be sharp enough to take advantage in any recognition of him as helping him dupe his victims. He laughs at and uses you whilst you help him cheat the community. Touching pitch defileth the fingers, and if the pitch is hot burns them also. Stop all social as well as professional intercourse with every pretender, and you will get his and the world's respect.

Our social position is a delicate one to touch on, as are all social questions in public, but our rela-

tions to the family and the individual are peculiar and often very close. Whilst in the community at large a person gravitates to his social level, it should not and cannot be so with us physicians. Our professional calling should render us the social equal of any. Where rank and cast prevailed, the physician started with but little tolerated social position. As the profession has risen in scientific attainment, it has gradually claimed and received social recognition for itself, through itself. It has to contend with all powerful rank and title and office. It speaks well for our calling that it has wrung even toleration from them. But this it has done only by showing superiority in scientific attainment, hard work in seeking and accumulating knowledge, which is power.

In our country the social lines are as strongly drawn as where rank and cast prevail, but we do not have these latter to contend with in taking or maintaining our social status. What position we occupy depends upon ourselves. In this a physician establishes his own status. The force of position and family inherited from former times, has been since our civil war pretty thoroughly broken down. Our communities are in a transition stage. What formerly existed can never prevail again among us. Social force and power always have been and will be influenced by wealth, which now seems to govern above its legitimate authority. Of course social refinement and cultivation must greatly depend on accumulated wealth in the community, and if the latter is used

to promote the former then civilization is advancing among us.

Already, however, the accumulation of money has reached its limit of effect and power. One Crœsus is very much like another. Midas, whilst at first he is most lavish to obtain social recognition, soon becomes more eager to help his descendants to a cultivation wholly dependent on knowledge and its pursuit.

If now the cultivation and refinement which family gives, is to be brushed away by democracy, and if democracy is not to bow down to accumulated wealth, then where shall social power and recognition come from? What shall constitute it? To me it is very plain that it can only come from and really exist in those who become refined by learning, the pursuit of knowledge, and the search of truth for truth's sake. Cultivation makes refinement. An uncultivated community cannot be a refined one in our country. I think I see the signs of culture becoming a social force, of a society based on the power of knowledge and the amenities of life this brings with it.

In such society our profession should be, and duly recognized there. Can we as a body claim such social recognition? Where are we to-day in the science and literature of our country as a body? When social distinction depends on the successful pursuit and accumulation of knowledge, and the character and refinement this gives, where shall the physician be placed? Is it not plain that he must gravitate socially to the level his ignorance

drags him? Is it not plain that the lack of educational refinement holds the profession from the social position it would naturally have? Has not the profession lost its force in the community from lack of the power of knowledge? Is not even now the individual physician's social position dependent on his individual educational refinement?

The community is forced to grant us a knowledge of things affecting the public health. Hygienic medicine is perhaps more respected than any other branch. Those pursuing it have gained their position by proving their knowledge. In time of panic we are always looked up to for advice, freely given by us, but rarely followed if it affects the individual pocket or the pockets of a class. Against human greed we are comparatively powerless. When to this greed is added lack of every moral restraint up to absolute criminality, then we can hope for but little good effect from our efforts. Should we not for that very reason more strongly put them forth?

Our profession cannot contend with what is called business in the accumulation of wealth. No man ever made a fortune as a physician. I mean no one ever paid his expenses and laid by at interest enough to live on, through the practice of medicine. I do not of course refer to those who have entered into business with their gains, by speculation or speculative investments. Such may have gained or lost as other so-called business men do. This we have in common with the other professions, though we are not so well positioned as

they, as we advance in life. Even with continued health and strength, and the largest possible amount of practice, a physician in this country can never acquire by his toil the incomes readily made in other occupations now recognized as professions. Moreover, many of these place a man in direct opportunity to become profitably interested in business enterprises, more or less associated with his special work.

It is therefore useless for us to contend with trade or business either in earning a living or the accumulation of money. Our profession is most essentially not a trade. Those in it who attempt to make it so but lower themselves to the level of trade, or simply money-making. Our calling belongs to that department of man's work recognized as scientific or knowledge seeking. We are simply men of science, that is, men of knowledge and its pursuit, the attainment of which is to benefit other people primarily. Now the world over, men who give themselves up to the pursuit of knowledge have been considered as worthy of only so much of this world's goods as will simply keep them bodily in a condition to work with their brains and hands in science seeking.

When these other professional men apply science, knowledge, to the useful arts, that is, render money-making possible, then their recompense may be very large. But the physician's science or knowledge is applicable only to relief of pain, the saving of life, or the increased healthfulness and bodily comfort of mankind. This the world does not

similarly recompense. The world at large values knowledge only as a means of making money. I say the world at large; fortunately for mankind there is a body of truth seekers for truth's sake. To this class our profession should belong. And we deserve recognition in it, because we do not keep what we learn, but disseminate our knowledge as quickly as possible for the benefit of humanity. True this humanity or the world at large simply regard us as fools for so doing. But the diligent study and the honest practice of medicine gives a man a power, and a self respect, and a consuming interest, a love of his profession, which lifts him above the assaults of the world. The physician has a contentment which aggravates as well as surprises those he comes in contact with. In this contentment we understand and hold by each other as kindred spirits.

No class in the community know better than physicians the baneful effect of what in general terms is called "filthy literature." Here *our* knowledge is of value, and our opinions will be received by the community. Have we not dreaded giving them from disgust at cant, pseudo-morality and false sentiment?

But there are associated together for the suppression of vice, good, honest, mentally strong, shrewd and prudent men and women, who have in their work to contend with the best paying criminal rascality and foulness existing among us. Money will flow like water to prevent legislative control. Are we as physicians, knowing and see-

ing all, doing our share in helping those properly at work for the suppression of vice? There can be no false stigma attached to any professional efforts of the kind.

Certainly one thing we should do, namely, by united action and condemnation, prevent medical book notices from being distributed, containing wood cuts, often perhaps totally unnecessary in the books themselves, and which in the pamphlet advertisements never induced the rightful sale of a single copy.

The respect of the old due to the young—I do not think anywhere in life this applies more strongly than in our profession. The young have first what time and the wear and tear of life slowly but surely eat away, namely, enthusiasm. Without this but little can be accomplished, and that little only as a burden. The young have that power of adapting themselves to new or changing circumstances which old men have not, and progress in our profession means just this. Capacity for work, both physical and mental, exists in the young that the old no longer possess, or but very exceptionally, and only to prove the rule.

A man has had thorough preliminary instruction in youth, and subsequent professional education of the best. He has talent and ability, and knows how to use these. He is urged for some place of trust and influence for which he is well qualified. "Don't you think he is rather young?" is heard from some over prudent objector. No, I want to reply, but your saying so proves that you are

already too old to retain your place. Respect for the young is prudence as well as justice.

How many years ago would it have been rank heresy to have urged any one under sixty years of age for the presidency of the then Harvard *College*, but the *University* has been built up by such an one, and not least the department we are interested in. Our society should reverse the maxim, young men for action, old men for councillors.

What! would you throw away the value and weight of experience? Certainly not, if the latter had any knowledge to start with, and the power and ability to constantly accumulate further, and to impart it. Merely having lived or practised so long, does not necessitate the increase of knowledge or a greater power of its application. Quite the reverse,—it may have simply frittered away originality by dull routine. Inexperience is often of real value, because it dares to do and try what experience has shown some one else *he* cannot do. Years of accumulated sameness is only worthy of the respect which age alone gives. Mere time does not make valuable experience; the latter comes from constant and progressive thought and study, and their intelligent application to professional life and work. Experience may or may not come with age; the latter does not of itself make it. This is one of the greatest fallacies of the present age in all departments of life.

Old age is to be respected for itself, but when it would guide our actions by its experience we demand to know what that has been, and of how

great value. Age as well as youth must prove its ability to have observed and drawn truthful conclusions, that is, to have advanced by intelligent study. Time does not make solid ignorance knowledge. But how eagerly the world seeks the experience of those who have proved themselves capable of having profited by it. The fancied accumulation of knowledge from the mere lapse of time is a dangerous mistake.

I often recall the following instance. In the Directors' room of a railroad corporation I had shown the officials the practical results of defective color sense by instances from among their employés. They could not and would not understand or admit it. One otherwise pleasant old gentleman sank back in his arm chair, and with almost a snarl of doubt and derision exclaimed, "Why Dr. Jeffries I have been railroading more than forty years; now if any such thing as color blindness existed, I must know all about it." And how far is the community from this *now?*

Education is the teaching the hands to work at advantage and the brain to think rightly. Certainly this applies to medical education. Proper medical education cannot be given the ignorant young man, and only young men should be made doctors. If the hands and brain have not been trained how to work, they cannot be properly employed in the higher field of human activity occupied by the physician. The advance in modern education comes not from additional amount of facts poured into the school boy or student, but

from applying improved systems by which brain work tells better.

It *is* possible to teach the power of observation, deduction, the application of principles, and sharpen the brain, the wits, to seize the time for action. The medical schools admitting young men without such preparation, even if they attempt to teach well and thoroughly, never can turn out the best physicians.

The young man in this country who wants to go into medical trade thinks he has only to learn a little and get his diploma as he would fit up a grocery shop. The community thinks so too. The so-called medical colleges scattered over the country are ready to help him for the fees he can scrape together to pay them. This tradesman opens his shop for custom, and the world looks upon and patronizes it like any other shop. But in medicine as in all the true professions, work but commences with the responsibility of occupation, and never ceases while that lasts. Better for a man if it lasts through his life.

Now these medical colleges, backed by the community, want the profession to foster such trade doctors, and have us accept them as colleagues. These men themselves claim our support and recognition, and would pull us down to their level to help their trade. The time has amply come for this to stop. The physician must rest on his individuality, on his learning and his power of using his knowledge.

If you carefully observe the men teaching and

learning in this and the two adjacent buildings,[1] and then compare them with the men teaching and learning in the building further on, in which we are, or should be, all interested, there will be found a difference of a peculiar and subtle character, the difference between the medical and the technical man. Perhaps only our profession can understand this. I have found very shrewd men in other professions, even the allied ones, much puzzled by it.

Here in technology, arts, sciences aside from us, the student learns facts, physical laws, principles, and their adaptation to physical conditions, and relies on set and fixed laws and rules for action. His work in life is a continuation of this. Here two and two make four, and can always be depended on as making four, mathematically deducible and proved as we say.

Now in the other building the medical student learns also facts, physical laws and natural principles. But in practice he has to apply them to unnatural conditions, disease. And he learns that the conditions of disease render mathematical application of seemingly fixed principles impossible. Two and two may not make four, and he must be able to grasp this fact. The study of medicine is for this, and four years is little time enough to learn the needed facts, their application, and so to speak misapplication. This it is which besides all else separates us from other professions, and but puzzles them. They see us arriving at results

[1] Buildings of the Institute of Technology and Natural History Society.

from data that their knowledge and experience prove mathematically can *not* come. This elusive something is the spirit of medicine; he who has it most will most successfully be able to detect and cope with disease, be the most successful physician. I do not mean as to the number of his clients. That is no proof of medical talent. It is in fact in this country more generally a proof of its absence. The pretender and the quack have the largest number of applicants for a time, till the next quack comes.

Since the slavery rebellion our nation has settled down to its civilization. Has our profession advanced with increasing education? Not the whole of it, for the reasons I have given. But there are many more men than ever before giving their strength and lives to the accumulation of knowledge in our calling, and its diffusion. Never before have there been so many men so highly educated in medicine as now. I cite as proof, the papers and discussions at our Society meetings, the articles published in our journals, the respect our best men are gaining from the thorough medical scholars and teachers of England and the continent. I cite further the greatly increasing number of physicians in the various branches of medicine who are becoming good and valuable teachers among us. Never before have we had such competent and thoroughly taught practitioners under thirty years of age. Never before have we had so much true scientific work going on in our profession. The graduates of even our best

schools are not content to stop their work, but seek in Europe the best teachers, to compare their acquirements, and bring back to us the highest medical culture of the old centres of learning.

Should these men be classed with the ill-bred and half-educated graduates of the remaining nine-tenths of the medical schools of this country? Because they have the same title, must they be put on the same plane as the business and trade doctors our communities are overrun with? Yet this is precisely the way they are at present treated and regarded by the laity, who make no distinction between one physician and another. And this by all classes of the laity, high and low, rich and poor, learned and unlearned.

The scientific man is often now startled by finding "a doctor" familiar with his own department. It is quite a revelation to him. Why, nearly all the work in the various sciences outside ours, now followed as professions, was formerly done by men graduates in medicine!

Among us and in our Society, this advance in medical education has been brought about by the thorough and complete change in the plan of teaching and instruction of our University School, the raising the standard of requirement, and the absolute refusal to grant a diploma of Harvard to any graduate who falls below such standard. Moreover, this elevation of the profession has been helped by the Massachusetts Medical Society also raising its standard of requirement. This is by no means so easy a thing to accomplish. The

School is strong enough to be independent and insist on a proved preparatory education before entering on its curriculum. Our Society can at present only insist, by increased severity of examination, on greater medical attainments.

But it can do much to support our School and its teachers in their position by letting it be understood, and acting on the declaration, that to enter our ranks the applicant must equal the Harvard graduate. The laity have no conception of the character of the teaching of our School. Have all the profession, all the members of this Society, a knowledge of its work and standing?

The most learned and scientific men in other departments have, I believe, but little if any knowledge of what this branch of the University and the very few other schools of similar standing in the United States are doing for the world. I regret that there are those, to whom to give this my judgment and words force and truth, I must say, as did the first president of the Suffolk District Medical Society[1] when in his annual address eight and thirty years ago he praised the "Boston Medical School," "I do not utter this under the pressure of the official toga which I have never worn; but I record it as the tribute of a grateful pupil."

Having said this, I am free to ask, is our School and others like it doing *all* needed to fit men to practise medicine, to use their hands and brains professionally? The success and the growing

[1] The author's father, Dr. John Jeffries.

number of poly-clinics and post graduate courses, right among our best schools, seem to me to positively prove that the student and the graduate find there is something more to be learned, and something worth giving time and money for. What better argument for the need of an additional year's study, however this may have to be arranged in reference to the under-graduate department of our universities and colleges?

If there are men who can as teachers attract earnest students outside of the regular courses, I do not see why they cannot be employed as teachers in the schools of four years' curriculum. This extra outside teaching I think has hindered the adoption of a four years' course as compulsory. It has fostered unfortunately the worst form of trade doctors among us, namely, the "two to six weeks'" fully fledged specialist with any "scope."

I disregard the objection to four years on the score of cost. The men who built our present medical school did not stop for this sort of objection, and time has proved them right. I record here my conviction, and I wish I could record the conviction of this Society, in the support of the teachers and workers trying to elevate the standard of the profession, and thus, for only thus can it be done, replacing our calling in the respect of the laity, at the same time completely separating us in their judgment from the bands of quacks, trade doctors *et id genus omne*.

There is not in medicine the same danger of the teacher becoming the pedagogue as in general

education. But I have suffered and seen others suffer so much from the latter that I cannot help give a warning word. Medical teachers hold the same sort of relation as do other educators. They must not be too sensitive to the push and prod of students and assistants in the struggle for existence. This should but keep them up to their work, as do the whole corps of young assistants the professors in Europe, whose places some of the former must finally fill. A man must wear his spurs after he has won them. Remember the respect of the old due to the young.

It is perhaps naturally expected of me here to say something in favor of those much *used* and much abused physicians called specialists. Whatever may be said against them, it must be admitted in candor that to stop the work they are doing would check the scientific advancement of the profession as a whole. Specialism means work, seeking science, knowledge, truth. It cannot be said that they keep from the profession or the world the results or benefits of their labors.

The same is now unfortunately true of the specialties as of the general profession. All I have said as to the laity's inability to distinguish between the true and the false applies with ten fold force as to specialists. Physicians recognize this even in their own inability to decide between pretence and talent, knowledge and ignorance, experienced training and assumed.

I greatly respect other specialties, and cannot see how we can get along without them. I have

to thank the men of talent and standing practising them, and have always found them as willing to help me as I them. They can defend themselves better than I can. Of my own I will say but a word. A foreign body in the cornea cannot be *prayed* out or *pried* out. The first our patient's wife has probably urged, the second been tried by a fellow workman or the nearest doctor. But a drop of cocaine, a lens, a rightly shaped and sharp needle in a steady hand, directed by an experienced eye, quickly relieves our patient of his foe and *fee*. This is specialism, and as such is likely to remain among us.

It was said in praise of a physician who died some years ago, that he was never seen in any place his profession did not call him. It was a proof of devotedness to his calling. In the then relations of the doctor to the community perhaps it was wise and necessary. All that has certainly passed away, never to return. We are now forced to be *en rapport* with the world, its people and affairs, and, I believe, with a gain thereby to our usefulness in the practice of our profession. The more a man knows outside of and in addition to his medical work, the better physician will he be. Such knowledge will never hurt his professional judgment, and will very often give him thereby a better opportunity to enforce what he knows to be necessary.

When a patient finds that we are by no means ignorant of *his* special work or business, can express an intelligent opinion thereon and have some

interest in it, then that patient is now-a-days much more likely to respect our professional advice and follow it. We have to guide and govern men and women, and we cannot without respect from the governed.

The community somehow still have an idea that physicians as a class are not capable of anything else than their own work, without business capacity, not practical. This certainly is not now the case. Well educated men in the profession are most practical, most prudent financially from necessity and experience, always recognizing and deploring waste and extravagance. In the expenditure of money for public and private charities they are now recognized as conservative and shrewd. Physicians, and most busy ones, had greatly to do with the collecting money for and its expenditure in the building of the great educational institutions on this street including the one in which we are now assembled.

Not only is a physician now-a-days allowed, if I may so say, to have some knowledge of the world of affairs, but he is beginning to be granted some familiarity with literature or with scientific pursuits, even when the latter are not directly connected with medicine. The profession at large and a part of the laity now begin to recognize the value of scientific thought and scientific study in our calling. It does not now hurt a man to be known as scientific, that is, seeking knowledge by mental labor. There was a time when this was a positive detriment, and militated against a man's opportunity to gain a livelihood.

When you ask an ignorant man to sign his name or read a sentence, he, rarely with shame, more often with a certain brutal indignation, announces that he is no "scollard." This is but a relic of the time when a feudal lord would have spurned the ability to write as his scrivener did. I see the same in the uneducated doctor when he declares, with a touch of resisting pride, that he "does'nt pretend to be scientific," as if all he did know was but the first step of science, in the path of which he has never trod or has lost his way. It is a dangerous thing for the profession to attempt to decry or belittle any scientific work its members are engaged in.

In the great world of scientific work our profession is needed and has its place. Its labor is special and separate, but calls strongly for thinkers, observers, truth seekers. This is the study of medicine, whilst the practice calls for the greatest endurance, patience, forbearance, toleration, and courage physical perhaps as well as moral. A thoroughly educated physician is a man of no mean parts, and will be able to hold his own with others in the world's affairs. His training makes him a good "all round man" and a *gentle*-man.

We should not resent but welcome the coming into the profession of young men with wealth and means that render them independent of work. Even if they practise they have the right. It was once said with some truth that the possession of thirty thousand dollars would kill any man's advance and work in our calling. That is not

true now. But the young men I speak of are most valuable in softening the spirit of gain and strife. There is work in abundance for them, and to advantage of us who must delve for our living. Their position enables them to do for us what we most need but cannot accomplish. They have hours for work without anxiety.

To study medicine and take a degree in a first class medical school after a collegiate course is a training most valuable. The knowledge gained is aside and besides all other, placing the graduated physician at very great advantage over his literary, artistic, and other professional friends. Moreover the study of medicine is earnest, serious, mentally stimulating, and gives a man breadth of character. It teaches him the value of work. One of the class of young men I am speaking of whom I had advised to follow our profession, said to me with great satisfaction and self respect: "To graduate here at our school sickens one for loafing and idleness."

The student learns that life and happiness mean work, work for others or self, but work, without which life at last is found not having been worth the living. The graduate learns also that there is no place in medicine for the Bohemian or the dude, that all attempts to act or imitate the one or the other are wholly out of place, as any of the peculiarities which were the marks of a physician in gone-by days. Even the white cravat worn at other times than when socially demanded, is now pretty well recognized as a medical hypocrisy,

Chinese mourning for departed patients. The true physician does and should dress as any other quiet gentleman.

Fortunately for us in this present day, and for the communities in which we live, the absence of means does not preclude the possibility of preparatory and medical education, and that of the highest grade. The State and the individual citizen has now given every man a chance who has brains to use and is willing to use them. It is the State's and individual's *charity*. Harvard University is an endowed educational charity of which every graduate is a recipient.

But absence of means must be an incentive to action, to labor, to study. For myself I know that any good which I have done for the community or for myself, has been done from the pressure of complete dependency on my own action. I believe every man finds this the case in life, hard as it may seem to him. Necessity is the mother of invention and the father of success.

In the *Kampf um Dasein* let us join hearts and hands and brains for the re-establishment of our beloved profession.

ARTICLE XI.

THERAPEUTIC NIHILISM.

By MAURICE D. CLARKE, M.D.
OF HAVERHILL.

READ JUNE 12, 1888.

THERAPEUTIC NIHILISM.

It has been said, and perhaps not altogether without reason, that what Matthew Arnold would call the stream of tendency of modern medical thought was toward a therapeutic nihilism,—at least in Boston. Now, if by nihilism in therapeutics were meant anything like the chaos the word implies, the charge would carry with it its own refutal. But, if the men that are fond of the phrase therapeutic nihilism mean by it that our creed is that of *laissez faire*, that our attitude by the bedside is one of folded hands, that, in short, we are willingly waiters and not workers, we may well plead to the indictment.

Doubtless there is something captivating in the phrase itself, since it stands out in evident contrast to the general instinct of humanity, testified to no less by the domestic thoroughwort and saffron than by the munificent hospitals and dispensaries of a larger charity, to do something for the sick. Whether to do something is necessary or not, whether it is wise or not, whether it may not be even harmful, we all understand, that it is expected of the physician, by common consent, to do something. How often, too, after having inquired as to the patient's bodily functions, regulated the diet, made suggestions as to bed and bedding, urged the importance of fresh air, and carefully attended to all the minute details for the patient's comfort, how often has it fallen to the lot of all of us to be confronted by the anxious friends with the inquiry, "But, aren't you going to do something for him, Doctor?" It is equally a matter of common knowledge, that this wide-spread sentiment of the laity finds its echo among physicians, and that a large

majority of them share the opinion that he fails of his duty and his privilege who neglects to do something. The alleged nihilist in therapeutics antagonizes, therefore, a rooted prejudice, not alone in the world at large, of whom nothing else need be expected, but among his own class, who might be presumed to exercise an intelligent judgment.

I remember very well, that the somewhat jejune proceedings of the Section of General Medicine of the International Congress at Washington last fall were refreshed one afternoon by a discussion on therapeutics, in which varying views were presented with an approach to animation. No speaker, however, met with a heartier reception or provoked louder applause than a gentleman from Ohio, who announced himself as an enthusiastic believer in active medication and in the new drugs, and who pointed his remarks by the terse statement, that, whereas rheumatic fever used to mean Dover's powder and six weeks, it now meant salicylic acid and six days. The man and the approval are typical. There can be no doubt that the popular current sets this way. It is the positive dogmatist that catches the public ear, and negations fail of attractiveness as they are difficult of proof.

I suppose there are few pursuits whose study and practice are characterized by so much zeal as that of the physician. The zealous medical student has become a proverb. And it is excess of zeal that has obscured and continues to obscure the exercise of a reasonable therapeutics. Each new drug that the botanist finds in the fields, the chemist in the retort, becomes to the ardent experimentalist an immediate specific for not one disease but many. It was so in the days of our fathers, it is so now, it is very likely to be so for some time to come. There is just dying from our midst the last of a generation that revered the lancet, and many of whom used to find their own materia medica in their neighboring woods and fields. The place their valued

remedies held was usurped yesterday by antipyrin, the day before by cocaine, and will be to-morrow by I know not what. It is stated in the current medical literature, with every appearance of truth, that cocaine, e.g., is "good in," to use the every-day phrase, gastralgia, childbirth, seasickness, nasal hæmorrhage, hay fever, rhinitis, hæmoptysis, etc.; while antipyrin is very fortunately useful in spermatorrhœa, pertussis, enuresis, locomotor ataxia, rheumatism, migraine, neuralgia, seasickness, epilepsy, phthisis, hay fever, hysteria, lumbago, sciatica, diabetes, chorea, and herpes zoster. But, alas, last week or last year the virtues of other drugs were lauded with equal assurance of their power. It is gravely stated in a dispensatory of the last century, that "examples are related of very dangerous phthisis cured by the continued use" of a conserve of red roses; and the tincture of amber is extolled as "having incredible efficacy in all those distempers which proceed from weakness and relaxation, and in hypochondriacal, hysterical, and cold languid cases."

But there are other causes operative to favor indiscriminate therapeutics besides the popular clamor for dosage and the professional tendency to energetic medication. Not the least of these is the vast number of physicians annually sent out by the schools, which, in the nature of things, must include many excellent blacksmiths and tradesmen. "In this country," says the president of the American Medical Association in a recent address, "the multitude of medical schools, offering to the educated and uneducated, by low fees and short terms of study, inducements to become doctors, together with the almost universal desire among laborers to become doctors, has worked incalculable mischief. We have waited almost half a century for the desired reform to be effected, but our expectations have not been realized. Many excuses have been brought forward, but there is no excuse which will free the medical schools of

this country from the responsibility of the odious defects of our system of medical education. The ratio of professional men in the United States to the population exceeds that of any other country in the civilized world. The ratio of practitioners of medicine to the population of the United States at present is about one to every five hundred and eighty, and there is very little danger that this ratio will be lessened. The supply will always equal the demand in spite of all difficulties." It is inevitable, that, the greater the rush to enter the profession, the greater must be the proportion of those who, having but a smattering of general knowledge before matriculation and looking after graduation upon the practice of medicine as a mere trade or means of livelihood, apply to it the same instincts and rules that govern the grocer's clerk and the carpenter's apprentice. It is inevitable, that quinine and calomel should represent to them to-day the saw and scales they dropped yesterday, and that they should bring to the treatment of that complex variation from the normal we call disease the same confident energy they once employed in the building of fences and the weighing of sugar.

So far, indeed, as the representative school of New England, in which some of us have a personal interest and pride, is concerned, it is well understood that it is not open to criticism of this sort. I am not disposed to affirm, nor would it affirm, that its curriculum is complete or its methods incapable of improvement. I have heard the complaint in years past, that its graduates had learned much about medicine, but had failed to learn how to practise it; that they had been taught the science and not the art of therapeutics; and that, when they were brought face to face with the every-day exigencies of private practice, they found themselves at a loss. Now it may easily be, that the student of the earlier days, riding his rounds with the country doctor, found something in the personal acquaint-

ance with his instructor and his instructor's methods, in the daily elbow-touch with his parishioners, in the actual sharing of the interchanging hardships and rewards of a physician's life,—found something that the modern medical school, even with the aid of hospital and dispensary, fails in the nature of things to furnish him. And it may well be that the modern medical school would do wisely in adding to its scheme a few lectures upon the practical side of medicine before turning its graduates loose upon the community. But this is not saying that the modern medical school holds a wrong attitude toward therapeutics, if, inclining neither to the rhapsodies and vagaries of the enthusiast on the one hand nor to the idle fatalism of the sceptic on the other, it aims to teach only such things as are believed to be truths in medicine, and leaves its students to deduce from them right conclusions.

The fact is that the treatment of the sick is very largely a matter of temperament. Some men are naturally disposed to look at disease from the standpoint of preventive medicine, some from that of hygiene, some with a reverence for the *vis medicatrix naturæ*, some with a belief in active medication. And the latter position is certainly the most attractive to the average medical man, and, in the presence of any serious illness, it is the most acceptable to the laity, in spite of the popularity of that therapeutic opera bouffe, homœopathy. Again, some men incline to run after new fashions, treating all diseases impartially and indefatigably with the newest discoverable drugs and endeavoring to keep up with the "samples" of the manufacturing chemists; this is experimental therapeutics. Others, too inert, perhaps, to shift for themselves, leave to these the practice of experiment, but borrow from them the suggestions their results afford; this may be called vicarious therapeutics. Others, again, settle back into the comfortable habit of always giving the same thing for the same disease, and

thus, having once been in travail and delivered of a diagnosis, have nothing left to do but consult their books or their memories for the indicated remedy; this method of practice, I suppose by far the most common and certainly the most degrading of all, is routine therapeutics. There are a few physicians, however, who look upon each case as to a certain extent *sui generis*, and who bring to its relief not only the results of the experience of the past and the experiments of the present, but also a personal opinion of the needs of the particular case, and who, so far as they are let, endeavor to do what a sound training, an impartial judgment, and an active conscience command; and this seems to me rational therapeutics.

I am aware that what I have said has been said before, and much better than I can say it. In fact, something like it was said fifty years ago before this Society by Dr. Jacob Bigelow, whose later writings repeat and emphasize the same idea. "It is the part of rational medicine," said he, "to require evidence for what it admits and believes. The cumbrous fabric now called therapeutic science is, in a great measure, built up on the imperfect testimony of credulous, hasty, prejudiced, or incompetent witnesses. * * * * The enormous polypharmacy of modern times is an excrescence on science, unsupported by any evidence of necessity or fitness; and of which the more complicated formulas are so arbitrary and useless, that if by any chance they should be forgotten, not one in a hundred of them would ever be re-invented. And as to the chronicles of cure of diseases that are not yet known to be curable, they are written, not in the pages of philosophical observers, but in the tomes of compilers, the crudities of journalists, and the columns of advertisers. * * * * * * The exaggerated impressions now prevalent in the world, in regard to the powers of medicine, serve only to keep the profession and the public in a false position, to encourage imposture, to

augment the number of candidates struggling for employment, to burden and disappoint the community already overtaxed, to lower the standard of professional character, and raise empirics to the level of honest and enlightened physicians."

There existed, indeed, in that day something that has fallen into disrepute in ours, and that is a belief in "heroic" medication. Active drugging does, to be sure, exist in plenty, but "heroism," in the sense of the exhibition of large quantities of nauseous medicine, no longer fetters the profession or frets the patient. Neither form of error, however, was spared by Dr. Bigelow's incisive pen. But this paper will not have altogether failed to be of service if it does no more than call attention, in these days of polypharmacy and superpharmacy, to truths which may have gained theoretical acceptance but failed of practical realization. The lesson cannot be said too often. No less an enthusiastic therapeutist than Roberts Bartholow has stated within three months, that "the science of therapeutics should be made more certain. This is a branch of medical study which is not cultivated as it should be, and a true knowledge of drug action is not widely enough diffused. The acquisition of this knowledge is greatly hindered by the mass of old prejudices which still cling to this science and impede its progress, like the barnacles on the hull of a ship. All this complexity and superfluity of olden times must be wiped away; at least two-thirds of the pharmacopœial preparations could be dispensed with, and scientific therapeutics would thereby be the gainer."

There appeared last fall a series of delightful reminiscences, personal and professional, from the pen of an honored member of this Society, whose ripe years included a half century of practice, from Laennec and Louis to Koch and Pasteur, who had seen the swift-handed surgery he was taught revolutionized by the discovery of ether, and who might have heard the then novel doctrine of the self-limi-

tation of disease from the lips of its learned propounder. In his earlier days, to use his own words, "a doctor's call meant something. An emeto-cathartic inevitably followed the first visit, no matter what the disease might be." The doctor "was called to do something at once, and he generally did it." His "course was simple and easy. He had to be 'heroic' only, with the lancet and heavy doses, and his responsibility was cancelled. If successful, he had been lucky in hitting upon the right medicine; if unsuccessful, it was the patient's misfortune. * * * * But, alas for the cautious or unheroic practitioner. His failures were accounted no better than homicides, if not indictable." When a man of this training and experience, at the close of fifty years of practice, publicly suggests as a fitting and self-desired inscription for his tombstone, "He cured the sick without drugs," it has occurred to me that we might be justified in occasionally neglecting to do something.

Yes, I repeat, if by therapeutic nihilism is meant that we are mere lookers-on in Vienna, none of us will admit that such is an attitude we keep or desire. But if it is charged, that in the presence of disease we maintain at once a reasonable faith and an honest scepticism; that we decline to fire at random and with all sorts of shot, in the childlike hope that Providence will kindly let us hit something; that, in short, we intend, as St. Paul advised the Thessalonians, to prove all things and hold fast that which is good,—then there are those among us, let us trust, who stand just there, unmoved by the ebb and flow of the tides of ignorance and prejudice. And why not? For, as Van Swieten said, a century and a half ago, in his Commentaries on the Aphorisms of Boërhaave, the learned professor of Leyden: "What will be the idea of the best Physician in future times we know not; but he is to be reckoned a good Physician now, who makes use of all the assistances by which, through the happiness of the present age, the art of Physick has been improved."

ARTICLE XII.

UTERINE DISPLACEMENTS AND THEIR INFLUENCE ON THE GENERAL NERVOUS SYSTEM.

By FRANCIS H. DAVENPORT, M.D.
OF BOSTON.

READ JUNE 12, 1888.

UTERINE DISPLACEMENTS AND THEIR INFLUENCE ON THE GENERAL NERVOUS SYSTEM.

UTERINE displacements have from the earliest times about which we have any medical knowledge been recognized as existing, and as giving rise to disturbances both general and local. It is probable that prolapse and procidentia, as being malpositions which would most quickly and surely be seen, were the first to be diagnosticated and treated. Later, as the vaginal examination became perfected, would follow the forward and backward displacements, reserving for these days of gynecological enlightenment the recognition of the more refined shades of departure from the normal, which have filled our text books with subvarieties, and for whose relief a legion of pessaries has been invented.

The impetus which has been given to the study of this branch of medicine in the last twenty-five or thirty years has resulted in placing a great deal that is of value on a sound basis. With regard to the special branch of uterine disease which is the subject of this paper, the following may be said. We have learned to diagnosticate the various malpositions to which the uterus is liable, and the tactus eruditus is now seeking new worlds to conquer. Tubes and ovaries whose recognition by a large proportion of practising physicians is still a matter of considerable difficulty are palpated by the trained gynecologist, and their pathological changes diagnosticated with wonderful ease. The more remote and insignificant structures of the pelvis are now trying in vain to elude the searching finger of the

specialist; and in one of the latest text books minute and lengthy rules are given for finding not only the round ligament and ureter, but even for differentiating the various muscles of the pelvic floor, and palpating the pelvic arteries and nerves.

The chapter on the diagnosis of displacements may in a certain sense be said to be closed. So too with the mechanical treatment of these disorders. Necessity is the mother of invention, and the skill and perseverance of the gynecologist in overcoming the difficulties he has had to contend with, have resulted in the multiplication of pessaries of all forms from the external to the intra-uterine, and of substances as various as ingenious, to meet all possible varieties. Slight modifications will continue to appear, but they will be on the lines already marked out, and will in all probability embody no new principle. It is to my mind a fair indication of the feeling which may be supposed to govern the question of treatment in the small proportion of cases which do not show themselves amenable to the mechanical devices alluded to, that progress is in the direction of operative measures, and that too of a bolder character than would have been dreamed of twenty or even ten years ago. Who, for instance, twenty years ago would have thought in his wildest moments of performing laparotomy and suturing the fundus uteri to the abdominal wall to cure an obstinate retroflexion? Yet that has been repeatedly done. It is an outcome to be sure of the feeling of security with regard to opening the abdominal cavity which the splendid results of our leading specialists have developed. Yet still other indications, less striking perhaps, but showing the same tendency, are the Alexander operation of shortening the round ligaments, Sänger's bold procedure of forcibly separating adhesions of the uterus to adjacent parts under ether, or Byford's proposition to shorten the sacro-uterine ligaments by an operation from the vagina.

While such questions as these are, as I have said, practically settled, it is a beneficent law which holds good in any department of human knowledge that it cannot be exhausted. Certain outposts are taken and occupied, and the scene of the conflict shifts to new ground. We know the course which the blood takes in its rapid circulation through the body. We busy ourselves now with counting the millions and billions of white and red blood corpuscles, and noting their varying proportions in disease, or discussing the microscopical character of the membrane which forms the coat of the capillaries. So the questions concerning displacements, about which doubt exists to-day, and which are the subjects of discussion, are on entirely different lines from those we have mentioned above.

Curiously enough, one question which it would seem would naturally be the first to be settled, is only recently being met with any unanimity of sentiment. I refer to the normal position of the uterus. It is begging the question to affirm as some writers do that an organ, suspended in the pelvis between other organs liable to such temporary variations of size as the bladder and rectum, can have no normal position. On the other hand it is manifestly absurd to judge a freely movable organ by the same rules as we would a spleen or kidney, and make any deviation from an arbitrary fixed standard a malposition. The truth seems to lie between, and the most accurate observers now recognize a normal position of the uterus which varies within certain bounds according to the condition of the adjacent pelvic viscera.

I have said that the question of the mechanical treatment of displacements was practically settled, meaning by that that where such treatment was indicated, the principles on which it would be carried out were essentially known. There still exists, however, great difference of opinion as to the advisability or necessity of such treatment at all.

Some writers, a respectable minority at least, maintain that displacements of the uterus very seldom give rise to symptoms, and that when they do general treatment is preferable to local. Still others claim that they are much more often the cause than the result of general conditions, and that not only is it useless to ignore mechanical treatment, but that the best results are obtained by such local treatment either alone or primarily.

These differences of opinion are based upon the different views which are held with regard to the dependence of one upon the other in the question of causation, and their subsequent reaction upon each other. Let me make this clearer by illustration. We find in a given case a malposition of the womb. With it is associated a debilitated state of the nervous system, which shows itself in the protean ways that are so familiar to us under the convenient but vague term of neurasthenia. There is now a problem to be solved in order to arrive at such a correct understanding of the case that we shall be able to treat it successfully. What has been the sequence of events in this particular instance? Has the general health begun to suffer, the nutrition become impaired, the muscular system weakened, fat absorbed, and as a result the natural supports of the uterus become relaxed, and thus allowed of a version or flexion? Or on the other hand has the uterus become displaced, has congestion resulted, followed by a low grade of inflammation, has this begun to react upon the nervous system, and finally resulted in the more or less complete loss of tone which we find in these cases? If we claim that the first hypothesis is correct, our course is plain. Build up the nervous system by rest and tonics, make fat and blood by forced feeding, and as the body becomes better nourished, and the muscular system grows stronger, the uterus will right itself.

On the other hand if we take the starting point to be the displacement, our rational plan is to restore the uterus to its

normal position, relieve the congestion, diminish the nervous strain, and our patient is cured.

There are today firm, I had almost said bigoted adherents of both these opinions. There are men who make light of the local symptoms of their neurasthenic patients, who claim that treatment of the genital organs rarely does good, and often does harm, and who concentrate all their attention on general treatment. So too there are others who refer all these complex and remote symptoms to some lesion of the pelvic viscera, and are content to treat those exclusively. As a natural and almost inevitable result of circumstances, it follows that those who devote themselves largely to gynecological practice should more often err in the last named direction, while those who from the character of their practice or from preference see few such cases should fail to give these symptoms their proper significance.

That neither of these extreme views is correct is self-evident. It is however insufficient to state in a general way that the advocates of both systems go too far. Little has been done unless such practical considerations are urged and demonstrated, as will set forth in a clear light the true relations which prevail between disorders in the genital sphere, and general nervous symptoms. It will be the object of this paper if possible to do this.

There are several questions to be discussed. In the first place we are met at the outset by the inquiry which suggests itself always in considering this subject, is the relation between the genital organs and the whole nervous system so peculiar, that disorders of the latter more often follow disease of the former, than is the case with other organs of the body? The ancients believed it to be so when they attributed to the influence of the womb, those nervous manifestations which under the name of hysteria we recognize as a common symptom of a debilitated nervous condition. We now know that hysteria is not necessarily

associated with uterine disease, that in fact it occurs in men, yet its preponderance in woman is a suggestive fact. Granted that a woman's nervous system is naturally weaker than a man's, may the cause not lie in the fact that her generative organs during their period of functional activity call for a greater expenditure of nervous force even when in health than any other organ or set of organs? If this is so in health, how much more potent must be their influence when diseased. That such nervous phenomena as we generally call hysteria or the more pronounced condition of nervous debility known as neurasthenia almost exclusively occur between the years of puberty and the menopause, confirms the opinion that there is in the majority of cases a more than chance relation between the disorders of the genital functions and the general nervous disturbance.

The clinical experience of those who have had the largest opportunities of observing these cases, will, I am confident, be confirmatory of this opinion.

There are undoubtedly certain classes of pelvic disease which more than others predispose to coincident nervous wear and tear. The amount of pain which accompanies the lesion is one of the criteria by which we judge of the probable effect upon the nervous system. We therefore find certain forms of ovarian disease accompanied by dysmenorrhœa very frequently associated with nervous debility. This rule is not absolute, however, for cancer with its gnawing pain does not affect the nervous system in the way that I am describing. It saps the strength and diminishes the vital powers, but it does not make the whole nervous organization hyperæsthetic, if I may so express it. Under this latter condition the nerves respond to the slightest stimulus, even that of a lively imagination, until it needs but a suggestion of discomfort in one part of the body to start reflex symptoms of the most acute type in another. There are certain affections of the female genitals which seem particularly

liable to exert this baleful effect upon the whole nervous economy. Some of these have been recognized. Emmet long ago, and many others since then have pointed out the marked results in this direction of a neglected laceration of the cervix. After the primary symptoms of leucorrhœa, backache, dyspareunia, and a feeling of weight in the pelvis have persisted for a longer or shorter time, there are very apt to follow those phenomena which begin as nervous debility and end as nervous prostration, and these latter symptoms may soon entirely predominate over the former.

This result is more apt to follow if in addition to the cervix the perineum is also lacerated.

Chronic pelvic cellulitis, of which we are hearing less and less, inasmuch as many cases which we formerly classed under this head are now known to be affections of the tubes and ovaries, chronic metritis, and its result areolar hyperplasia, and even chronic endometritis, all furnish their contingent of neurasthenic cases.

Less however has been said about displacements as a cause, and yet I conceive that they not infrequently are the starting point of grave nervous trouble, and serve to keep it up. This cannot be said of all forms of displacement alike, and some consideration of the various malpositions of the uterus with reference to their significance in this respect, is of importance here.

Backward displacements of the uterus are by all means more serious than forward ones. The retroflexions and versions occur oftener, admit of a much greater degree of malposition, and with themselves dislocate other organs more than do the anteversions and flexions. The resulting disturbance to the blood and nerve supply is much more profound. Anteversions pure and simple are in my experience rare, and do not as a rule give rise to symptoms. When however with the anteversion there is some descent of the uterus as a whole, a combination which is by no

means rare, the resulting effect upon the whole system is much more marked. The same may be said of anteflexion, though here symptoms referable to the bladder and back, and disorders of menstruation are much more common.

Retroversion of the uterus is the most common form of malposition that we meet with, and when of the first or second degree, that is if the version is not more than one of 90°, it may often exist without symptoms. If the organ however is deflected from its normal position in which the long axis of the uterine body makes a right angle with the axis of the vagina, more than 90°, we have symptoms arising from pressure on the rectum, and are apt to have dislocation of other organs. The danger of neglecting the treatment of even the slighter degrees of this displacement lies as I conceive it in the fact, that as the axis of the uterus approaches that of the vagina the weight of the abdominal viscera comes directly upon the fundus, and the resistance to descent of the uterus being lessened, slight degrees of prolapse are likely to follow.

Retroflexion adds to the symptoms which it causes in common with the version, those due to the uterus itself being bent, either from a loss of tone of the muscular structure of the organ, or from being drawn over by adhesions. This flexion of the uterus is an exceedingly grave symptom, and productive of the most marked general disturbance. Both for this reason, and because its treatment is often difficult, requiring even severe operative measures for its relief, it is commonly regarded as perhaps the most serious displacement in the category.

Prolapse and procidentia follow closely on retroversion in frequency, and equal if not exceed it in importance. The severer forms of falling, especially when complicated with a rolling out of the anterior and posterior vaginal walls, cystocele and rectocele, are so easily recognized by both patient and physician, that their true value as a cause of

local and general symptoms is accorded them. Not so however with the milder forms, where either from increased weight, or a slight giving way of the natural supports, the uterus sinks a little lower in the pelvis. These relatively minor grades of displacements are very often passed by unheeded, when they in reality are a cause of constant and distressing symptoms. They are not recognized for the reason that in the ordinary method of examination they cannot be detected. With the patient in the dorsal position the uterus, unless fixed, recedes from the vulvar orifice, and the examining finger fails to detect its abnormal mobility. Even if the patient is requested to strain, the action of the abdominal muscles is not sufficient to force the uterus as low as it descends when the patient is standing and the force of gravity is added. The proper method of examining in these cases is with the patient standing in the erect position. Then if she is requested to contract the abdominal muscles as if to relieve the bowels, the finger in the vagina will appreciate the full amount of descent.

In the same category though of less relative importance are the displacements of the vaginal wall which may occur without any prolapse of the uterus, though their tendency is to produce such in time. They have only recently begun to receive the attention which they deserve.

Lateral displacements are merely subvarieties and minor complications of the forward and backward malpositions which we have spoken of, and do not need any special mention.

From the foregoing it will be seen that the displacements, which most often give rise to serious symptoms and demand treatment, are of the third degree or of lesser degrees when complicated with prolapse, retroflexion especially when bound down by adhesions, and prolapse; less frequently anteflexion, anteversion with prolapse, and least frequently of all simple anteversion, and retroversion of the first two degrees.

If we study this order of relative frequency closely it will be seen that there are three conditions upon which the gravity of the symptoms depends. First prolapse, second adhesions, and third flexion. I have named them in this order because it seems to me that both as regards severity of local symptoms, and secondary effect upon the whole system, especially the nerves, that is the proper order of relative frequency and importance.

I am convinced that prolapse of the uterus especially in its minor forms has been much neglected or underestimated as a factor in the pathological significance of uterine displacements. A large proportion of anteversions give rise to no symptoms unless complicated with prolapse; the same is true of many cases of retroversion, and the symptoms complained of in these cases are those characteristic of a descent of the womb, and are relieved by the treatment appropriate to that malposition. A slight amount of prolapse will cause more disturbance with the circulation than a very marked version, and the constant dragging and bearing down, which is the almost universal complaint, is excessively wearing upon the nerves.

The detrimental effects of the presence of adhesions are shown in two ways: first, from the impairment of the mobility of the uterus which ensues; and second, the production of pain due primarily to the inflammation of the peritoneum, and secondarily to the implication of nerve filaments in the contracting bands of adhesions.

A bending of the uterus upon itself is of importance pathologically for several reasons. The two chief causes however to which its effects upon the general health are due, are the interference with the circulation in the organ itself, as a result of which alterations of tissue occur in time, and the displacement of other organs, notably the tubes and ovaries.

Having thus considered in a general way the various

malpositions to which the uterus is liable, and the special circumstances connected with the different forms to which their pathological importance is due, it remains briefly to refèr to their effect upon the system at large, and to insist upon the necessity of treating them.

I do not by any means claim that uterine displacements are always the primary occurrence, and that they invariably cause grave nervous symptoms. On the contrary there is that large class of cases of displacement from loss of tone of the uterine supports where muscular debility is the first factor, and the uterine condition is merely one mode of expression of it. But even in these cases the continued presence of the pelvic trouble tends to keep up the condition of nervous debility of which it may be originally only a symptom.

Of the three principal factors in these cases of displacement to which I have referred—flexions, adhesions, and prolapse—the importance of the first two is I think sufficiently recognized by the profession. The rôle they play in inducing and keeping up a state of nervous exhaustion is well known. The difficulty here is not that the necessity of treatment is not fully appreciated, but that they rank among the affections of the genital organs which are the most obstinate to yield to the ordinary methods.

Cases of flexions with adhesions were for a long time, and still are by some authorities, considered incurable, and it is the exceedingly unsatisfactory results of the methods of treatment which have been hitherto tried, in a class of cases which entails so much local suffering, and exercises such a deleterious effect upon the whole nervous system, which has led to such severe operative measures being proposed and tried for their relief, as laparotomy, forcibly breaking up the adhesions, and stitching the fundus to the abdominal wall.

It is however different with prolapse, especially in the earlier stages. The importance of this has I am confident

been underestimated. I claim that it is the one element which makes versions, which would otherwise give rise to no symptoms, of any pathological significance. The constant feeling of weight in the pelvis, to which is soon added weakness of the muscles of the back and thighs, making locomotion painful, and standing even more difficult, is generally due either to the yielding of the muscular and ligamentous supports of the uterus, or the loss of the integrity of the pelvic floor as a result of parturition.

I would therefore urge in all cases where the loss of nervous tone is a prominent symptom, where headache, dyspepsia, inability to walk, sleeplessness following the least excitement, loss of mental power, as shown by the inability to concentrate the mind on any subject, loss of ability to control the emotions, evidenced by fits of crying, depression, or temporary exaltation of spirits followed by a corresponding reaction, where some or all of these symptoms are found, the careful consideration of the accompanying pelvic symptoms, and if such exist, even though to a mild degree, would recommend a vaginal examination.

If any of the various malpositions be found which have been described in this paper, the important question has to be decided whether it should be treated and when. If the history of the case makes it clear that it is the primary factor in the case, the first step should be the attempt to cure the pelvic trouble by treatment. The only exception to this rule is in those cases where the general health is so much reduced that the strain necessary to undergo local treatment would be too great. Here attempts must first be made to so improve the nervous condition, by rest, food, and tonics, that treatment may be begun. The Weir Mitchell treatment, either thoroughly carried out or modified to suit the individual case, will serve as a model. In cases of this sort, if local treatment is entirely neglected there may be improvement up to a certain point, but beyond that

it will not advance if the special treatment of the genital complication is neglected.

Where the malposition is secondary, if taken in time local treatment may sometimes be avoided. With the improvement in the condition of the general system the uterus may recover itself. If it has persisted for some time, however, it in turn becomes one of the causes which keep up the depreciated state of the general health and must be rectified before perfect health is restored. In these cases of profound nervous debility, every organ and function must be interrogated, and the ability to correctly estimate the pathological significance of the various departures from the normal condition which are found, and the choice of the order and methods of treatment, is a matter requiring extreme delicacy and skill, and upon it depends the success of the physician.

As to the methods of treatment to be pursued, it is not the purpose of this paper to go into details. A few general considerations may be urged. Malpositions uncomplicated by adhesions or by inflammatory conditions in the pelvis, especially in unmarried women, may frequently be restored to their normal position and a pessary adjusted with a minimum of nervous strain to the patient at one sitting under ether. Where there are adhesions, or even in cases where there are not, but the vagina is narrow, the abdominal walls rigid and the bimanual method of reposition difficult or impossible, the slower method by packing the vagina is to be recommended.

Where the uterus on examination in the dorsal position seems normal, but yet the patient complains of symptoms which suggest some displacement, the examination in the erect posture for the slighter degrees of prolapse should not be neglected.

Of especial importance to my mind in this connection are slight tears of the perineum, impairing the integrity of the

pelvic floor. These are often overlooked because they not infrequently occur either at the sides where they loosen the attachments of the pelvic fascia or beneath the mucous membrane in the muscular structure of the perineal body, and the almost intact external perineum gives no evidence of the damage done. These changes, the result of parturition, are a fruitful source of prolapse of both uterus and vaginal walls, and their repair by a plastic operation will do much towards restoring the general health.

In the obstinate cases of retroflexion where a pessary will not hold the uterus forward, the Alexander operation of shortening the round ligaments or one of the other more serious operations may be considered.

ARTICLE XIII.

A STUDY OF PHTHISIS AND PNEUMONIA IN MASSACHUSETTS; STATISTICAL AND CLIMATOLOGICAL.

By W. EVERETT SMITH, M.D.
OF BOSTON.

READ JUNE 12, 1888.

A STUDY OF PHTHISIS AND PNEUMONIA IN MASSACHUSETTS.

In 1862, Dr. Henry I. Bowditch expressed his firm belief that "Consumption is not equally distributed over New England, but is intimately connected with and apparently

CORRECTION.

On page 252, line 24 from top, and also on page 256, line 28 from top, in place of 24.89% *read* 15.99%.

On page 253, line 24 from top, in place of "but according to the *total number of deaths* from the disease by all nationalities," *read* "but according to the *total number of deaths from all diseases* in the given nationality."

pared a circular letter, similar in many respects to that used by him, and have mailed it to many of you during the past few months. The replies have been so prompt and so cordial as to lead me further into the study than I at first designed, and have diverted me temporarily from some of my earlier intentions.

I regret that the limits of the present paper will not allow me to do full justice to these replies, nor to compare them properly with the vast volume of correspondence upon the subject accumulated by Dr. Bowditch during the eight years prior to 1862 and generously loaned to me by him. I am

[1] Medical Communications of the Mass. Med. Society, Vol. X., No. II., 1862.
[2] 1884, page xiv.

CORRECTION.

On page 252, line 24 from top, and also on page 256, line 28 from top, in place of 24.89% *read* 15.99%.

On page 253, line 24 from top, in place of "but according to the *total number of deaths* from the disease by all nationalities," *read* "but according to the *total number of deaths from all diseases* in the given nationality."

A STUDY OF PHTHISIS AND PNEUMONIA IN MASSACHUSETTS.

In 1862, Dr. Henry I. Bowditch expressed his firm belief that "Consumption is not equally distributed over New England, but is intimately connected with and apparently dependent on the humidity of the soil"[1]; and was supported in the belief by a remarkable consensus of medical opinion. In 1884, the Report of the Massachusetts State Board of Health claimed that "the disease is quite equally distributed throughout the State."[2] These two propositions, in conjunction with the fact that the Massachusetts Registration Reports since 1865 have annually stated that consumption is becoming less destructive in the State year by year, seemed to justify the hope that a renewed study of the disease with more complete data than were available thirty years ago might prove both interesting and instructive.

After consulting with Dr. Bowditch, I accordingly prepared a circular letter, similar in many respects to that used by him, and have mailed it to many of you during the past few months. The replies have been so prompt and so cordial as to lead me further into the study than I at first designed, and have diverted me temporarily from some of my earlier intentions.

I regret that the limits of the present paper will not allow me to do full justice to these replies, nor to compare them properly with the vast volume of correspondence upon the subject accumulated by Dr. Bowditch during the eight years prior to 1862 and generously loaned to me by him. I am

[1] Medical Communications of the Mass. Med. Society, Vol. X., No. II., 1862.
[2] 1884, page xiv.

confident they will throw new light upon many questions that otherwise go unexplained, but must reserve their analysis for some future time.

The common opinion that the statistical and climatological relations of phthisis and pneumonia are already clearly understood is both erroneous and deplorable, and arises from the fact that the diseases have been widely but not altogether wisely studied. Conclusions regarding both their prevalence and their distribution have long enough been drawn from data either inaccurate or inaccurately handled. Yet the task of iconoclasm is never agreeable, although it may be at times advisable or even necessary.

My present study is based chiefly upon meteorological data supplied or derived from the U. S. Signal Office in Boston[3] and from private observers throughout the State, and upon the Registration Reports of the State of Massachusetts and the City of Boston.

That there are errors as well as defects which might easily be remedied in our system of registration is so obvious as to need no proof. The State of Massachusetts began a system of Registration as early as 1842, but the early reports are so fragmentary as to be utterly worthless for deductive study, the records of the City of Boston being especially imperfect. Since 1855, however, the registration of vital statistics has been fairly complete and probably as accurate as is possible under the existing order of affairs.

Yet one must enter the study of them prepared for many strange and vexatious disappointments; first of all, that we are unable to draw from them deductions that are absolutely positive concerning the relative prevalence and distribution of deaths from diseases that are confessedly common. We

[3] For the seventeen year daily averages of temperature together with the rain fall and wind charts, I am indebted to the extreme kindness and courtesy of Gen. A. W. Greely, Chief Signal Officer U. S. A., and to Serg. J. W. Smith and Assistants of the Boston Signal Office. I am indebted to them also for allowing me to compute from the original records the daily barometric and humidity averages which I present. See Chart No. 7.

cannot doubt that consumption, cancer, heart disease and cholera infantum are reported far in excess of actual deaths from the diseases they are intended to represent, since many of the returns have probably been made by those entirely ignorant of the diagnosis of disease. To what extent this vitiates the trustworthiness of the records we cannot know, since we cannot ascertain the names of the reporting physicians or attendants. Since, however, the records of one town are as likely, on the average, to be as faulty in this respect as the records of an adjoining town, it is fair to assume that the data when averaged for a long series of years are as fair an estimate of the distribution of disease within the State, as we can at present hope to obtain.

We are justified then in believing that the disease popularly called in the records, consumption, represents upon the whole the average *conception of phthisis*, since the disease is so well marked and so characteristic, in its later signs at least, that it seems impossible for it to be radically mistaken for anything else by observers of intelligence even somewhat below the average. That it is not, however, true tubercular phthisis, but represents in many cases some chronic catarrhal affection, we need not hesitate to affirm. With pneumonia also, although it may be prudent to assume a large percentage of error in diagnosis, we must I think allow that on the whole the recorded diagnosis stands for some acutely febrile and rapidly fatal lung disease.

Yet even if the diagnoses be theoretically correct, we cannot accurately investigate the distribution of consumption by comparing the deaths in one locality with those in another without at the same time knowing an additional fact, namely, the locality in which the fatal disease probably *originated*. This lacking datum could by a slight modification of the returns be in many cases as easily supplied to us as is the merely accidental place of death; but unfortunately it is not supplied. The inferences to be drawn regarding the local

distribution of pneumonia are probably somewhat more correct since the disease is more sharply acute in its progress.

The element of heredity in the causation of consumption has been neither questioned nor considered in detail because it has seemed probable that during the long series of years that we have studied, family predisposition has been as active in one locality as in another, so far at least as it makes necessary any correction in our deductions.

The results of this study are arranged in tabular form, but to facilitate their comprehension the graphic method has been adopted for their expression, thus clearly showing at a glance conclusions which can be derived from the tables by extended labor only. It is fair however to say that the charts I show portray only the most prominent and striking data, and do not represent a tithe of the material I have accumulated.

On Chart No. 1, the *continuous*[4] but irregular line represents the average annual death rate of consumption per 10,000 living population for every town in the State, for the period of ten years from 1856 to 1865 inclusive, while the *dotted* irregular line shows the rate for the same towns for the period of sixteen years from 1871 to 1886 inclusive.[5]

It is easy to see that as the Registration Records stand, towns side by side (and I have endeavored to arrange them as far as possible by geographical relations) differ in mortality as markedly *now* as they did thirty years ago, although

[4] The *wavy* irregular line upon the same chart represents pneumonia.

[5] The population of the individual towns for the period 1856 to 1865 has been calculated by averaging the census reports of 1855, 1860 and 1865; for the period 1871 to 1886 by averaging the census reports of 1870, 1875, 1880 and 1885. In order to preserve the proper ratios between the towns, the State workhouse at Bridgewater in Plymouth County, the State Almshouse at Tewksbury in Middlesex County, and the State Primary School at Monson in Hampden County, have been excluded both from the population and from the mortality aggregates, since these public institutions are filled with foreign paupers who have gained no residence within the State. Furthermore, the population and mortality of Roxbury, Dorchester, West Roxbury (from Norfolk County), Brighton and Charlestown (from Middlesex County) have been transferred to Boston for the entire period we have studied, in order to compare together the ratios of the latter city, although these annexations were made at different times *during* the period (Roxbury in 1867, Dorchester in 1869, Brighton, Charlestown and West Roxbury in 1873).

the *general rate* of mortality appears to show considerable improvement. The distribution of the disease is not however so unequal in degree when *groups* of towns are compared together, for there is no extended area within the State that appears to be even moderately free from the ravages of the disease. The counties however present differences so marked as to deserve separate attention.

Chart No. 2 contains a study of consumption in the State by counties for three periods of ten years each, while on Chart No. 3 is a similar study for the entire period of thirty years from 1856 to 1885 inclusive.[6]

In the paper of Dr. Bowditch to which I have made reference, as well as in the Registration Reports, the counties of Middlesex and of Norfolk are regarded as *inland* because they approach the sea in limited area only. I have preferred to adopt the grouping of counties used in the U. S. census of 1880, a grouping corresponding more closely than any other to climatic and geographical conditions.

Under this division, the sea coast region includes all the eastern counties of Massachusetts as far west as Worcester county, and comprises a strip of land fifty to seventy-five miles wide along the sea, a surface mainly undulating and a rocky and sandy coast. In this region, the extremes of heat and cold are lessened to a certain degree by the pres-

[6] The population in these tables has been calculated as before by averaging the State and National censuses; for the entire period of thirty years by averaging the censuses of 1855, 1860, 1865, 1870, 1875, 1880 and 1885; for the 1st period of ten years by averaging the censuses of 1855, 1860 and 1865; for the 2d period, the censuses of 1865, 1870 and 1875; for the 3d period, the censuses of 1875, 1880 and 1885.

The population and mortality of Plymouth County have been modified for the entire period by excluding the statistics of the Bridgewater workhouse for the same reasons as were given in the previous note; of Middlesex County by excluding the State Almshouse at Tewksbury; and of Hampden County by excluding the State Primary School and workhouse at Monson. So too, the population and mortality of Suffolk County have for purposes of accuracy in comparing ratios been increased by including for the *entire* period of thirty years the data of the several annexations which have from time to time *within* the period been made to Boston from Norfolk and Middlesex Counties, as specified in the previous note. The data of these annexed towns have correspondingly been deducted from their original counties for the entire period of thirty years.

ence of the ocean, the atmosphere is moister and the rainfall greater than on the hills and plateaus farther inland. Yet there are variations both of surface and of climate of such a character as to produce decided differences in the relations of certain localities to the causes of disease. The mean elevation is below three hundred feet, and the density of the population (exclusive of Suffolk county) has averaged about two hundred persons to the square mile for the period of the last thirty years.[7]

In the region of hills and plateaus are all the western counties of the State. The surface of this region is hilly and broken, the mean elevation above six hundred feet, the climate more rugged and variable than in the coast region, and the density of population has averaged about ninety persons to the square mile.

A study of these county charts will show that consumption relative to the living population is far *less prevalent in the hilly* than in the sea coast counties, the average annual death rate per 10,000 population for the period of thirty years being in the western counties 29.67 against 34.64 in the eastern. That the *average* rate throughout the State is on the decrease is also clearly seen, being for the three periods respectively 36.9, 33.6 and 31.0 per 10,000 population, a decrease of 24.89% from the 1st to the 3d period of our study.

In this connection it would be useful to compare the rates of mortality from consumption among native American and foreign residents, in order to determine the value of the foreign element which forms so large a part of our population, its innate healthfulness, its power of resisting disease, and its degree of adaptability to our climate. And not only this, we ought also to compare the white and the

[7] Suffolk County has averaged a density of population equal to 6,550 persons to the square mile. Its population, averaged for the period of 30 years, is 19.28% of the population of the entire State. As I shall show at a later time, however, I do not find any inherent relation between the density of population and the mortality from either phthisis or pneumonia.

colored population. This Dr. E. P. Hurd has admirably done for Newburyport.[8] The comparison throughout the State would be possible, however, only for the census years, but the necessary data are not available for even these years.

It is true, we have the *living* population expressed in the census tables both as *native born* and as *foreign born*, and as *of native parentage* and *of foreign parentage*. But the registration reports give *death rate* tables, divided only by *foreign born* and *native born*. Such statistics are quite unsuitable for sanitary study, inasmuch as they are anomalous in their age distribution, the tables showing the native born being made to contain much more than their quota of children, while those showing the foreign born are composed principally of adults.

The reports of the city of Boston are still more unsatisfactory. The City Registrar discontinued any practical study of consumption about 1878, because, as he says, the disease was already so well understood, while he has never tabulated the mortality from pneumonia by nationality. Furthermore, in his nationality tables of consumption, so long as they were made, a serious error stands forth to increase our ignorance. The percentage of deaths by nationalities is figured, not according to the *population* by nationality, but according to the *total number of deaths* from the disease by all nationalities, thus giving us a confusing and mischievous tabulation of disproportions. We are in doubt too regarding the total number of deaths in any given disease, since the figures of the registrar confessedly[9] do not correspond with those of the Board of Health; yet they work, or are supposed to work with precisely the same data.

The fact that the towns throughout the State, when taken individually, show an unequal and irregular distribu-

[8] Consumption in New England. Boston Medical and Surgical Journal, March 29 and April 5, 1883.

[9] Annual Reports of Boston Board of Health; of Boston City Registrar.

tion of consumption, while the counties show a more or less regular distribution, seems to point to some decidedly local elements of causation. I have alluded to the careful and altogether admirable study which our honored Dr. Bowditch has made of this local distribution of consumption, and had confidently hoped that I might corroborate his conclusions that soil moisture is a potent cause of the disease, especially in view of the fact that he has within the past fortnight (after the body of my paper had already been written) called my attention to an editorial in the British Medical Journal[10] which tends to throw doubt upon the soil moisture theory, so far at least as it pertains to England.

Unfortunately, I am informed by Prof. N. S. Shaler, our most eminent authority upon the geology of the State, that it is impossible to give any accurate statement of our soil structure. He has, however, in progress for the U. S. Geological Survey a very minute study of soil structure and the distribution of marshes, lakes and forests throughout the State, which when completed will be of incalculable benefit to our profession. In the medical interpretation of this work he has been kind enough to ask my co-operation, and although the survey will not be in shape for deductive study for nearly three years, we shall be amply repaid for the waiting by the painstaking excellence of his work. And I am strengthened in this belief by the fact which Prof. Shaler states, that from the very diversity of the surface contour and of the resulting climate of our State, we have the field the best fitted in all the world for such a deductive study as we contemplate.

Let us turn to a statistical consideration of pneumonia. On Chart No. I. the *wavy* irregular line represents the average annual death rate from pneumonia per 10,000 population for every town in the State, for the period of 16 years, from 1871 to 1886 inclusive.[11]

[10] British Medical Journal, Feb. 25, 1888, page 426.
[11] The population has been calculated in the same way and the mortality tables modified for the same reasons as have been already stated in Note 5.

As with consumption, so with pneumonia. Adjoining towns differ widely in their rates of mortality. Some of this variation, as also in consumption, is unquestionably accidental or erroneous; yet, as I have stated, it is probable that the relative ratios between the towns are fairly well preserved because of the long series of years for which the averages have been taken. That the variations which our charts show have unquestionably a deep significance is seen more clearly by Chart No. 2, where for the three periods of ten years each the average annual death rate from pneumonia per 10,000 population is shown by counties, and by Chart No. 3,[12] where the same data are shown for the period of 30 years.

With the single exception of Suffolk County, that compact metropolitan "heavy weight," if I may so term it,[13] towns in the eastern counties, and especially in those which have the greatest range of sea coast, have not only a *rate* of mortality from pneumonia absolutely less, but a *variation* from town to town less marked than in the counties situated more in the interior of the State. Furthermore, in all the sea-coast region, notably in the south-eastern counties around Cape Cod, the rates of mortality from pneumonia are vastly less than from consumption. But the further west we travel into the interior hilly region, the more the mortality from pneumonia increases and the more nearly do the rates for pneumonia and consumption approach each other, until finally in Franklin and Berkshire, the counties of highest altitudes and most irregular surface contour, the mortality from pneumonia *exceeds* in several places the mortality from consumption.

Since I have drawn the charts for consumption and pneumonia upon precisely the same scale, it is very clear that pneumonia, although usually regarded as an exceedingly common disease, has a comparatively small mortality,—only two fifths that of consumption.

[12] See Note 6. [13] See Note 7.

It is obvious that death rates do not adequately represent the state of public health nor the real amount of sickness and its distribution. This is more markedly the case with pneumonia than with consumption. Scores of cases of pneumonia, either in individual localities or in separate years, may occur without a single death, while in the same towns during different years the mortality may be enormous. And this too under precisely the same routine of treatment.

To study more accurately the actual prevalence of sickness, voluntary weekly reports of disease were attempted by the Massachusetts State Board of Health in 1875, but unfortunately were not continued long enough to warrant deductive conclusions. Similar reports have been collected in Michigan since 1876, and when properly studied in conjunction with mortality reports are the only really practical means of utilizing the vast volumes of statistical data that are rolling up from year to year. But in Massachusetts we must for the present at least be content to study *dead* tables of mortality, and to arrive at very meagre and unsatisfactory conclusions.

We have seen that during the past thirty years the mortality from consumption has been steadily *decreasing*. With pneumonia, on the contrary, the fatality has been as markedly and as rapidly *increasing*, being respectively 10.8, 13.5 and 15.2 per 10,000 population for the three periods of ten years, an increase of 40.74% from the 1st to the 3d period, while consumption within the same time shows, as we have seen, a decrease of 24.89%. To discuss exhaustively this increase would lead us far from our present study, although the figures might seem to strengthen Dr. Hartshorne's clear and able review of the modern methods of treatment to which I had the privilege of listening last February at the College of Physicians in Philadelphia.[14]

[14] Pneumonia: its Mortality and Treatment. A Statistical and Rational Inquiry. By Henry Hartshorne, M.D. Transactions of the College of Physicians of Philadelphia, Feb. 1, 1888.

So far then as we can learn, the distribution of pneumonia throughout the State is in direct opposition to the distribution of consumption. Nor is the difference between the prevalence of the two diseases less strikingly shown by a comparison of their mortality rates when they are studied by sex, age and month.

It is commonly asserted and universally believed that "the fatal epoch in consumption is between the ages of twenty and thirty" (Mass. Regis. Rep. 1864, p. 57), and that the rate of mortality "then diminishes through the remaining periods of life" (*ibid.* 1882, p. 95); in other words, that "consumption is specially a disease of that period when bodily vigor should be greatest" (*ibid.* 1869, p. 62). So too, notwithstanding the belief that "pneumonia is a sthenic disease and belongs more especially to the more robust portion of the people" (*ibid.* 1864, p. 59), it is claimed that "the greatest mortality occurs under five years of age" (*ibid.* 1865, p. 73). There are reasons for believing that these statements are incorrect, that they are fallacies of deduction.

The methods of studying the distribution of disease are three in number, two of them inaccurate, misleading and without the slightest show of reason for their use, yet at the same time almost universally adopted in Registration Reports; the third accurate and simple, yet rarely employed save in life insurance tables.

Having observed, for example, that a larger number of deaths from consumption occur in cities than in rural districts, the first thought that arises is to compare this mortality from consumption with the total mortality from all causes. Logically then the inference is clear that consumption may be less prevalent in the cities than in the smaller towns and villages. But such a deduction we know to be far from the truth, and for this reason. Zymotic diseases (so called) and the summer diarrhœas of infancy greatly increase

the total mortality in crowded cities, and by their extreme fatality render deaths from consumption less prominent. Hence it is evident that in this case we unwarrantably infer consumption to be less *prevalent* because less *prominent*.

No one however can deny that the greatest *number* of deaths from consumption actually do take place between the ages of twenty and thirty, and from pneumonia before the age of five. This is a matter of simple observation and cannot be disputed. Yet it tells us nothing of the relative distribution of these diseases among the different age periods of life, because it does not once take into consideration the immigration increase of the living population between the ages of fifteen and thirty and the rapid natural decrease at the higher ages.[15] No one would for a moment think of asserting that Boston is relatively healthier than London *because* its actual number of deaths is less. There can be no comparison between the health of the two cities *until* the actual number of the living population among whom these deaths occur is at the same time considered. Yet just this error is committed whenever we calculate the relative liability of any given age to a disease by calculating the percentage of deaths at this age to the total number of deaths at all ages from the same disease.

Page after page of such valueless and misleading tables as are thus drawn from statistics by these two faulty methods are annually printed at State and City expense throughout the Commonwealth, to the utter confusion of medical opinion. Blind belief in the accuracy of averages! The only possible method of determining with accuracy the distribution of mortality from any disease by sexes or by age periods is to compare death rates which have been computed according to the population actually living of the specified sex or age.

Chart No. 4 is a study throughout the State of the sex

[15] See Table No. 1.

TABLE No. 1.

STATE OF MASSACHUSETTS. 1856 TO 1885, INCLUSIVE—30 YEARS.

See Chart No. 4, and pages 258, 260 *et seq.*		PHTHISIS.			PNEUMONIA.			ALL CAUSES.		
LIVING POPULATION: AVERAGES OF 7 CENSUSES.		TOTAL NUMBER OF DEATHS.	DEATH LIABILITY PER 10,000 POPULATION	PER CENT. Faulty method	TOTAL NUMBER OF DEATHS.	DEATH LIABILITY PER 10,000 POPULATION	PER CENT. Faulty method	TOTAL NUMBER OF DEATHS.	DEATH LIABILITY PER 10,000 POPULATION	PER CENT. Faulty method
TOTALS.	1,494,994	152,548	34.0	100.00	60,239	13.5	100.00	874,662	195.02	100.00
Males.	719,749	68,309	31.6	44.78	30,820	14.3	51.16	436,766	202.28	49.94
Females.	775,245	84,214	36.2	55.20	29,403	12.6	48.81	436,650	187.75	49.92
Not stated.		25		0.02	16		0.03	1,246		0.14
Under 5.	158,081	9,117	19 2	5.98	21,022	44.3	34.90	307,255	647.9	35.13
5 to 9.	149,250	1,574	3.5	1.03	1,812	4.0	3.01	37,945	84.7	4.34
10 to 14.	140,836	2,751	6.5	1.80	710	1.7	1.18	17,944	42.5	2.05
15 to 19.	145,426	13,830	31.7	9.07	1,374	3.2	2.28	31,623	72.5	3.62
20 to 29.	288,553	42,648	49.3	27.96	3,671	4.2	6.08	88,121	101.8	10.08
30 to 39.	220,149	29,101	44.0	19.08	4,207	6 4	6.98	71,439	108.2	8.17
40 to 49.	164,535	19,124	38 7	12 54	4,807	9.8	7.98	60,714	124.0	6 94
50 to 59.	111,903	13,527	40.3	8.87	5,358	13.0	8.90	59,116	176.1	6.76
60 to 69.	70,334	11,488	54.4	7.53	6,738	31.9	11.19	68,957	326.8	7.85
70 to 79.	33,539	7,134	70.9	4.67	6,787	67.5	11.27	72,450	720.1	8.29
80 and over.	10,370	1,594	51.2	1.04	3,531	113.5	5.86	53,208	1710.3	6.09
Not stated.	2,018	660		0.43	222		0.37	5,890		0.68

and age distribution of consumption and pneumonia, the area *shaded by lines* showing the average annual death rate per 10,000 living population for the thirty years from 1856 to 1885, while the *dotted* area shows the faulty method of percentages for the same period. In order to illustrate more clearly still the errors of the percentage method I have shown a similar thirty year study of the total mortality "from all causes" throughout the State.

Although the disproportions of the percentage method are very evident at all ages, they are most clearly seen in the early and the latter periods of life. According to the Registration Records but contrary to common opinion, the disparity between the liability of the sexes to consumption is *not* great, although it is true that females are slightly more prone to the disease than males. With pneumonia the converse is seen to be true; the liability to death is greater among males. In about the same ratio, the liability to death from all causes is also greater among males, although here again the percentage method does not show it.

How the sexes compare in the age distribution of mortality, the State Reports do not show, but I had hoped to ascertain from the reports of the Boston City Registrar. For a few disjointed years the figures for consumption, but not for pneumonia, can be obtained, but the age periods that have been adopted are not identical from year to year. Since 1878 there are absolutely no data that are available. Neither is it possible without a personal and expensive study of the written records at the City Hall to gain any idea of the local or ward distribution of these diseases in the city. Such results are surprising, disappointing and vexatious.

To return to the State Records.[16] The liability to mortality from consumption, so-called, is great during infant life, declines to its lowest ebb between the ages of five and fifteen, reaches a higher level at the ages of twenty to thirty, is then

[16] See Table No. 1 and Chart No. 4.

relatively lower until the age of sixty, but *rises to its acme* between the ages of sixty and eighty. These data not only contradict common opinion, but are at variance with clinical experience and hospital records. Shall we then pronounce them false and utterly ignore their testimony? I grant that hospital records of consumption are correct so far as they go, but they have to deal mostly with the poorer classes, with foreigners and with constitutions broken by debauchery and excess, so that there is the possibility at least that they may not be a true index of the health of the people at large. That individual clinical experience with the disease would unquestionably settle the age distribution beyond appeal cannot be doubted, but as I have already said we have no records of such experience throughout the State at our disposal, and the common opinion derived solely from individual *memory* is far from trustworthy.

We are inexorably driven to one of two conclusions: either to accept deductions which are cautiously drawn from the Registration Records, or to condemn the Records as a waste of money and a travesty of science, since, as has been well said, statistics which are thus unreliable are worse than useless because misleading.[17]

With pneumonia the liability to death appears in infancy enormous, practically disappears during puberty, then rises gradually until the age of sixty, and *leaps wildly upward* during the remainder of life. Such a distribution of disease as we have shown directly contradicts the mendacious testimony of percentage tables computed from the same data,[18] but a hasty glance at the percentage tables of total mortality "from all causes" is sufficient to prove such percentage estimates radically untrustworthy. By the liability tables, the

[17] Dr. H. I. Bowditch. The Birthplace of Consumption. British Med. Jour. May 19, 1888, page 1085.

[18] Strangely enough, Flint (Practice of Medicine, 5th edition, pp. 167 and 206) appears also to follow this percentage method of calculating the age predispositions of phthisis and pneumonia, and arrives at conclusions almost identical with the tables in the Mass. Regis. Reports which I am here criticising.

greatest mortality, both from pneumonia and from all causes combined, occurs, as we should expect, at the two extremes of life ; *by the percentage tables, old age appears strangely exempt from decay.* Curiously enough the entire charts for pneumonia and for deaths "from all causes" bear a very striking resemblance to each other.

The frightful liability of infants to consumption and pneumonia which our statistics show needs a word of explanation. For consumption this apparent liability is without doubt due in large measure to a faulty diagnosis of the diseases of malnutrition, while under the term pneumonia are unquestionably concealed forms of the disease, differing so widely in pathology and history as practically to form separate diseases.

Chart No. 5 shows the distribution of consumption and pneumonia by the months of the year throughout the State for the period of thirty years from 1856 to 1885 inclusive, while in Chart No. 6 we have the same data for the city of Boston (divided by sexes) for the sixteen years from 1871 to 1886 inclusive. Whether pneumonia be due to a specific microbe or not, its fatality is clearly connected with the cold months of the year from November until May. Consumption, on the other hand, does not at first sight appear to be markedly affected in fatality by the weather. That both diseases have however the most intimate relations with atmospheric conditions will be seen conclusively by a study of meteorological data.

In the study of meteorology as well as of statistics, there is a strange confusion of ideas, and we as a profession are to blame for it. In the first place, since we cannot radically change a climate we have been too apt to be content with "glittering generalities." All this is wrong. There are many ways in which we can not only modify a climate but also adjust ourselves to its variations if only we have once learned what climatic conditions are requisite for health.

Secondly, we are logically led to false conclusions by a study of monthly and yearly averages. The monthly and yearly averages of Boston for a series of years show a climate apparently regular, fairly equable and as well, if not better, adapted on the whole to health and recovery from respiratory diseases than, for example, the climates of Norfolk, Va., Jacksonville, Fla., San Diego or Los Angeles, Cal.[19] In other words the *variability* of our climate has been utterly concealed, a variability which can be known only by a study of mean daily *ranges* of temperature and humidity.[20]

TABLE No. 2.

BOSTON, MASS., AVERAGE DAILY RANGES OF TEMPERATURE.

Compiled from Data furnished by U. S. Signal Office, 1882 to 1887, inclusive—6 years.

	Average Number of times *Daily* Range of Temperature has been 18° or more.	Average *Maximum* Range of Temperature.	Average Daily Range of Temperature.
January.	13.5	32.8	17.3
February.	11.5	31.5	17.0
March.	12.5	28.8	16.8
April.	13.3	31.9	17.1
May.	13.0	35.2	17.2
June.	17.8	29.0	19.1
July.	15.7	28.6	17.8
August.	12.2	27.8	17.1
September.	13.0	33.2	16.8
October.	11.7	27.8	15.9
November.	10.8	29.5	16.1
December.	8.8	38.4	15.4
Average.	12.82	31.21	16.97

[19] See Table No. 3. [20] See Table No. 2 and Chart No. 7.

TABLE No. 3.

Compiled from Reports of the Chief Signal Officer, U. S. Army.

Temperature, November, 1879 to December, 1884, inclusive.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual
Boston, Mass.	26.4	30.1	33.9	43.6	55.3	65.8	69.9	68.8	63.5	51.7	40.0	31.4	48.4
Portland, Me.	24.6	28.7	34.0	44.7	55.1	65.0	69.6	68.6	62.3	51.0	39.6	30.1	47.8
Norfolk, Va.	40.7	46.6	48.0	55.6	67.6	75.2	78.9	76.7	73.1	63.7	51.2	44.6	60.1
Jacksonville, Fla.	57.4	61.4	64.2	69.6	74.9	80.7	82.7	81.0	77.7	72.6	62.5	58.4	70.2
Denver, Col.	30.3	29.5	39.6	47.2	55.4	66.9	72.3	70.5	62.0	50.1	36.5	31.7	49.4
Los Angeles, Cal	52.0	53.1	54.7	57.6	61.8	65.6	68.2	69.6	67.5	61.8	57.4	54.5	60.4
San Diego, Cal.	52.8	53.5	55.1	57.8	61.4	64.5	66.9	68.5	66.3	61.5	57.2	55.6	60.1

Average Range of Temperature for the Year 1884.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual
Boston, Mass.	15.7	16.0	16.0	14.1	18.7	21.3	17.3	15.8	19.5	17.7	17.5	15.1	17.06
Portland, Me.	16.1	15.4	15.5	14.2	15.8	18.3	15.9	14.5	16.5	15.3	14.0	13.8	15.44
Norfolk, Va.	16.4	18.0	16.0	14.9	18.1	17.2	15.0	12.1	15.8	16.5	15.8	14.3	15.84
Jacksonville, Fla.	18.0	17.3	16.5	16.5	15.9	14.3	14.7	15.7	14.1	15.1	16.4	14.5	15.75
Denver, Col.	23.5	21.4	20.6	21.1	22.5	24.3	28.3	23.8	26.8	26.7	26.4	23.9	24.11
Los Angeles, Cal.	21.5	16.5	16.1	19.3	18.4	21.1	28.3	27.0	25.7	23.1	25.2	17.2	21.62
San Diego, Cal.	19.0	14.4	12.5	13.3	11.4	13.7	14.6	14.1	12.9	14.6	18.1	13.7	14.36

Relative Humidity. Nov. 1879 to Dec. 1884, inclusive.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual
Boston, Mass.	71.9	72.7	71.0	66.4	70.6	69.7	71.9	72.8	74.1	71.1	70.2	72.3	71.3
Portland, Me.	71.1	69.2	65.4	60.0	64.5	66.5	69.6	70.9	72.9	69.6	69.2	72.4	68.4
Norfolk, Va.	77.6	71.2	67.3	66.8	67.1	69.3	71.5	75.3	75.7	75.6	70.6	73.2	71.8
Jacksonville, Fla.	76.6	71.8	65.5	68.5	70.5	71.7	73.2	75.7	77.4	77.1	76.5	76.0	73.4
Denver, Col.	53.6	55.8	49.5	50.0	53.5	47.9	47.3	49.4	43.6	51.5	53.3	58.4	51.2
Los Angeles, Cal.	62.7	65.0	72.5	72.7	71.3	70.4	70.8	70.6	68.9	67.9	61.4	67.1	68.2
San Diego, Cal.	65.6	68.5	74.8	74.0	73.3	74.5	75.6	76.5	75.3	71.2	64.6	69.6	71.9

RAINFALL. JAN. 1880 TO DEC. 1884, INCLUSIVE.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual
Boston, Mass.	4.89	4.45	4.73	2.92	4.05	3.13	4.14	2.20	3.52	3.57	2.47	3.61	43.68
Portland, Me.	4.22	4.82	3.38	2.70	4.06	2.91	4.18	1.75	3.[illegible]5	3.15	2.64	4.32	41.50
Norfolk, Va.	4.84	3.31	4.84	4.17	2.65	5.03	6.03	4.41	4.32	3.29	2.97	3.92	49.78
Jacksonville, Fla.	4.88	2.26	2.39	3.62	3.93	4.98	6.44	7.54	5.43	8.16	4.14	2.59	56.36
Denver, Col.	0.80	0.61	0.48	1.74	3.04	1.72	1.49	1.49	0.55	0.83	0.75	0.78	14.28
Los Angeles, Cal.	1.71	4.28	4.20	2.22	0.62	0.28	0.00	0.00	0.00	0.56	0.77	3.24	17.89
San Diego, Cal.	1.62	2.90	2.19	1.26	0.72	0.11	0.02	0.07	0.02	0.71	0.22	2.30	12.14

BAROMETER REDUCED TO SEA LEVEL. JAN. 1880 TO DEC. 1884, INCLUSIVE.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.	Annual
Boston, Mass.	30.115	30.112	29.930	29.916	30.003	29.953	29.924	30.025	30.063	30.117	30.115	30.158	30.036
Portland, Me.	30.086	30.077	29.904	29.881	29.978	29.927	29.891	29.997	30.044	30.083	30.074	30.024	29.988
Norfolk, Va.	30.176	30.181	30.005	29.991	30.030	29.998	29.997	30.044	30.078	30.133	30.183	30.147	30.080
Jacksonville, Fla.	30.192	30.196	30.086	30.035	30.033	30.036	30.053	30.030	30.049	30.076	30.160	30.164	30.092
Denver, Col.	29.881	30.184	30.093	29.917	29.853	29.763	29.830	29.855	29.904	30.007	30.282	30.222	29.983
Los Angeles, Cal.	30.135	30.129	30.086	30.061	29.991	29.961	29.988	29.950	29.948	30.011	30.086	30.095	30.037
San Diego, Cal.	30.101	30.110	30.063	30.030	29.968	29.937	29.957	29.917	29.913	29.972	30.042	30.054	30.005

DIRECTION OF THE WIND. 12 YEARS TO 1884.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Boston, Mass.	N W	N W	N W	N W	S W	S W W	S W	W	S W	W	W	W
Portland, Me.	N W	N W	N W	N W	S	S	S	S	S	S W	N W	W
Norfolk, Va.	N	N E	N	S W	S W	S W	S W	S W	N E	N E	N	N
Jacksonville, Fla.	N E	N E	S W	S W	N E	S W	S W	N E	N E	N E	N E	N E
Denver, Col.	S	S	S	S	S	S	S	S	S	S	S	S
Los Angeles, Cal. (6½ yrs. only)	N E	N E	W	W	W	W	W	W	W	W	N E	N E
San Diego, Cal.	N E	N W	W	W	W	W	W	W	N W	N W	N W	N E

But the very terms "humidity" and "dry air" have such an unparalleled latitude of meaning as to lead us into errors deeper still. The subject of humidity is too complex for a complete discussion here, but for many reasons I think it evident that the important consideration is not, as has been claimed by high authority, the *absolute* amount of moisture in the air, but the amount *relative to full saturation*, since it is this "relative humidity" which expresses evaporating or, in other words, "drying" capacity. It is true that relative humidity "is not a per cent. of some fixed quantity, but varies with every degree of temperature;"[21] yet it does not by any means follow that an amount of moisture absolutely large is at all times and under all conditions equally injurious.

Comparing now Charts No. 5 and 6 with Chart No. 7, which gives the average daily records[22] of the Boston Signal Office since its establishment in 1871, we find that the greatest mortality, both in phthisis and in pneumonia, occurs in the months of greatest *variability* of temperature and of barometer accompanied by high winds[23] and great *ranges* in relative humidity. Nevertheless the two diseases are not identical in their monthly distribution, and this difference leads us to more exact conclusions. Pneumonia appears most fatal in the months of the *greatest* and *most sudden* variations of low temperature, while phthisis in months of mere *variability*, whether the temperature be high or low and whether the variation be sudden or gradual.

It is equally apparent that mere *cold* is not the determining factor in the fatality from pneumonia, since the mortality rates are highest in March and April, nor mere *moisture* the only element of danger in phthisis, since in the warmer

[21] Annual Report Michigan State Board of Health, 1881, p. 427; see also other Annual Reports of the same Board for similar statements.

[22] These *averages* are not only important as recorded data, but they have a positive predictive value of the probable condition of the atmosphere at any given period of the year.

[23] See Table No. 4.

months of summer when both the absolute and the relative humidity are the highest, the mortality from the disease is at its lowest ebb.

The climate of New England has been greatly overdrawn and opinions have been too freely formed from daily impressions and individual memory. Data that are accurate are as yet very rare. Enough have been obtained, however, to prove that observations for one locality are by no means true for neighboring localities subjected to different exposures and elevations.[24]

I have said that our State presents a remarkable diversity of contour and of soil. This, in conjunction with the conclusions I have drawn from a careful study of meteorological observations from various and widely scattered portions of the State, leads me logically and conclusively to the belief that there are, within a few short miles from home, localities as favorable climatically for recovery from respiratory diseases, and for many emphatic reasons far preferable to the distant *death resorts* commonly recommended to invalids as health resorts. "You must try a change of climate," has so far become the fashion and the routine of professional advice as to demand a halt until we have more accurately determined its absolute advisability and necessity, and have more fully studied and appreciated the value of our present surroundings.

A popular idea is that the East wind is particularly common on our coast. The records of the Signal Office show the contrary to be the fact. Our prevailing winds are clearly west and northwest. East winds, whatever may be our individual opinion upon the subject, are comparatively rare save in summer afternoons, and even then the West and Southwest winds predominate.[25]

The practical advantages of a local climatic study, such

[24] Among others may be cited the very striking table in 2d Annual Report of the State Agricultural Experiment Station at Amherst, Mass., 1884, page 149.
[25] See Table No. 4.

TABLE No. 4.

AVERAGE NUMBER OF TIMES (THREE OBSERVATIONS DAILY) THE DIRECTION OF THE WIND HAS BEEN RECORDED AT THE BOSTON SIGNAL OFFICE, 1871 TO 1887, INCLUSIVE—17 YEARS.

COMPILED FROM OFFICIAL DATA.

	N	N W	W	S W	S	S E	E	N E	CALM	Velocity per hour. Miles.
January.	9.6	26.7	24.6	13.2	4.8	3.8 A.M.&P.M.	3.5 P.M.	4.5	2.1	10
February.	6.9	25.9	20.1	12.2	4.0 P.M.&N.	3.9	4.4 "	6.0	1.8	9
March.	8.5 A.M.&N.	29.2	19.0	9.4	6.8 N	6.4	6.8 "	6 6	2.7 A.M.	10
April.	7.6 "	21.3	17.2	8.1 A.M.&N.	6.1 P.M.&N.	6.7 P.M.	13.2 "	8.2	1.7 A.M.&N.	8
May.	5.3 "	15.5	15.7	15.8	7.4 "	9.1 "	13.4 "	8.5 A.M.	2.5 N.	7
June.	4.9 "	13.1 A.M.	18.5 A.M.&N.	17.3 N	7.9 "	8.0 "	11.4 "	5.6 "	3.2 A.M.&N.	8
July.	4.2 "	13.2	21.0	20.7 "	8.3 "	5.5 "	11.0 "	5.3 "	3.9 "	6
August.	5.8 "	14.5	20.1 A.M.&N.	16.6 "	6.7	8.7 "	11.0 "	6.1 "	3.3 "	6
September.	6.6 "	14.5	18.0	16.1	10.9	6.7	9.6 "	7.8	2.7 "	6
October.	7.2 "	16.2	22.3	14.8	7.1	6.9 "	9.4 "	6.2	2.3 "	7
November.	7.9	22.2	25.5	12.7	6.6	3.6	4.6 P.M.&N.	5.2 P.M.	1.3	9
December.	9.3	25.3	27.5	11.9	6.3	4.1	3.5 P.M.	3.9	1.1	8

Time of Observation: A.M.—7.35 or 7; P.M.—4.35 or 3; Night—11.35, 11 or 10.

for example as the New England Meteorological Society have now in progress, are very great, especially if the data thus obtained be applied to a renewed study of the local distribution of respiratory diseases throughout our State.

If soil moisture be a positive cause of consumption, what shall we say of the atmosphere, that ocean of moisture in which we live, where hills and valleys stand for headlands and harbors, hills and forests for breakwaters, and winds for tidal currents? The questions arise—Is soil moisture the only moisture to be dreaded? Is it *per se* more dangerous than other forms of moisture? Admitting that consumption is more prevalent in the eastern than in the western part of our State because in part of the more humid ocean atmosphere, we must still remember that moisture is governed in its distribution no less by the contour of the land and the relative situation of the hills and forests than by the physical character of the soil. Admitting that the fatality of pneumonia is less prevalent in our eastern than in our western counties, because of the equalizing influence of the briny ocean upon the *variations* of our climate, we must remember how greatly the broken surface of the western counties, —the rugged hills with thin soil and the deep valleys with *sharp* diurnal variations of temperature and humidity,— modifies the climate of adjoining towns or even of areas within the same town.

That the general climate of the State has not as a whole within the limit of the recorded data markedly changed there is abundant evidence.[26] Yet the instances where local conditions of climate have been modified and improved by the hand of man are by no means few.

It is true that to any climatological or meteorological explanation of our data the objection may be raised that we have not taken into account the influence of the birth rates,

[26] See, for example, the Annual Reports of the Mass. Agricul. Experiment Station at Amherst, and the Table of Temperatures by C. Breck, of Milton, Mass.

varying as they do in the different counties of the State, and modifying the age groups of the population and therefore the relative rates of mortality. On the contrary, I have carefully compiled for study not only the birth rates but also the age distribution of the living population in the several counties. But, strange to say, there are no published returns of the mortality of the counties divided into age periods. We can therefore neither fully nor accurately trace the relation by counties between the rates of birth and the rates of death at specified ages from phthisis, pneumonia or any other disease. Taking however the aggregate mortality at all ages, we find that counties which have a low birth rate do not have a uniformly high death rate from phthisis, nor a uniformly low death rate from pneumonia. In fact the birth rate in the sea-coast region for the thirty years from 1856 to 1885, inclusive, has averaged 36.21 (per 1,000 population) against 25.34 in the hilly region, so that it seems only fair to look for an explanation of our data in some deeper cause than the mere rate of birth, although, to be sure, the latter must have a due consideration.[27]

In discussing the climate of our coast region, one point of prime importance must not be lightly overlooked. That the north and the south shores of Cape Cod differ not only in healthfulness but in climate has long been known, but has commonly been supposed to depend almost entirely upon the genial influence of the Gulf Stream. More careful investigations within the past few years have very clearly shown the deathly chill upon our climate of the cold Arctic current which streams directly into Massachusetts Bay and bathes the shores of Sandwich and of Plymouth.

There is a persistent struggle along our coast, not only

[27] I suspect, moreover, that the different occupations and habits of life of our different counties may have a very important influence upon the distribution of the mortality from specified diseases, and shall hope to arrive later at some definite conclusions in the matter.

between the ocean and the inland climate, but between the warm and the cold currents of the ocean; while equally constant is that remarkable struggle—the transition from the Atlantic to the Bay of Fundy system of tides, forming off Nantucket the so-called "Tidal Node." Here, as Prof. Mitchell of the United States Coast Survey writes me, "the ocean is troubled, giving rise to strong currents through the Vineyard and Nantucket Sounds, and there is more hurrying to and fro of great bodies of water than anywhere else perhaps in the ocean world." All this reacts upon the distribution of disease.

But time fails me to be more minute. The most I can hope to do in this fragmentary paper is to deal with methods, to clear away some of the fog that encircles us and to outline in a meagre and perhaps unsatisfactory way the fruitful possibilities of climatic study in our State. The deeper and more localized investigations which I have made but cannot here detail would, I feel confident, prove as absorbingly interesting to you as they have been to me, and might perchance add something to our common fund of knowledge. I shall hope to present this study to you in a more complete and instructive manner, when by the hearty co-operation which Prof. Shaler has promised to my work I shall be enabled to arrive at conclusions more eminently practical.

At present we must be content with the following brief conclusions:

1. Consumption is very unevenly spread through Massachusetts. The causes of its distribution are many. While it seems probable that soil structure has a controlling influence, is is reasonably certain that *local variations* of climate and the struggle between the elements on the sea coast are a most prominent factor in developing the disease.

2 Pneumonia is also unevenly spread throughout the State, and is likewise influenced in its distribution by local

differences of climate depending upon situation, exposure and the like. It is developed during those portions of the year which are marked by the *greatest* and *most sudden variations* of temperature, humidity and barometric pressure.

3. We are soon to have an admirably exact survey of Massachusetts which should be of great value when medically interpreted. A complete or in any way satisfactory interpretation of the data cannot however be given under the present system of registration, although it would seem easy to modify these methods and incalculably increase the value of the records. It is eminently proper that the Massachusetts Medical Society should be interested in this study, and I would recommend that a committee be appointed[28] to undertake, in behalf of the Society and in conjunction with Prof. Shaler of the U. S. Geological Survey and Gen. Greely of the U. S. Signal Service, who are already thoroughly interested in the matter, a careful investigation of the local causes of the distribution of disease within our State.

[28] See Proceedings of the Society, page 45.

CHART 1. COM

Mashpee (in Barnstable County) and Gay Head (in Dukes County) have been exc

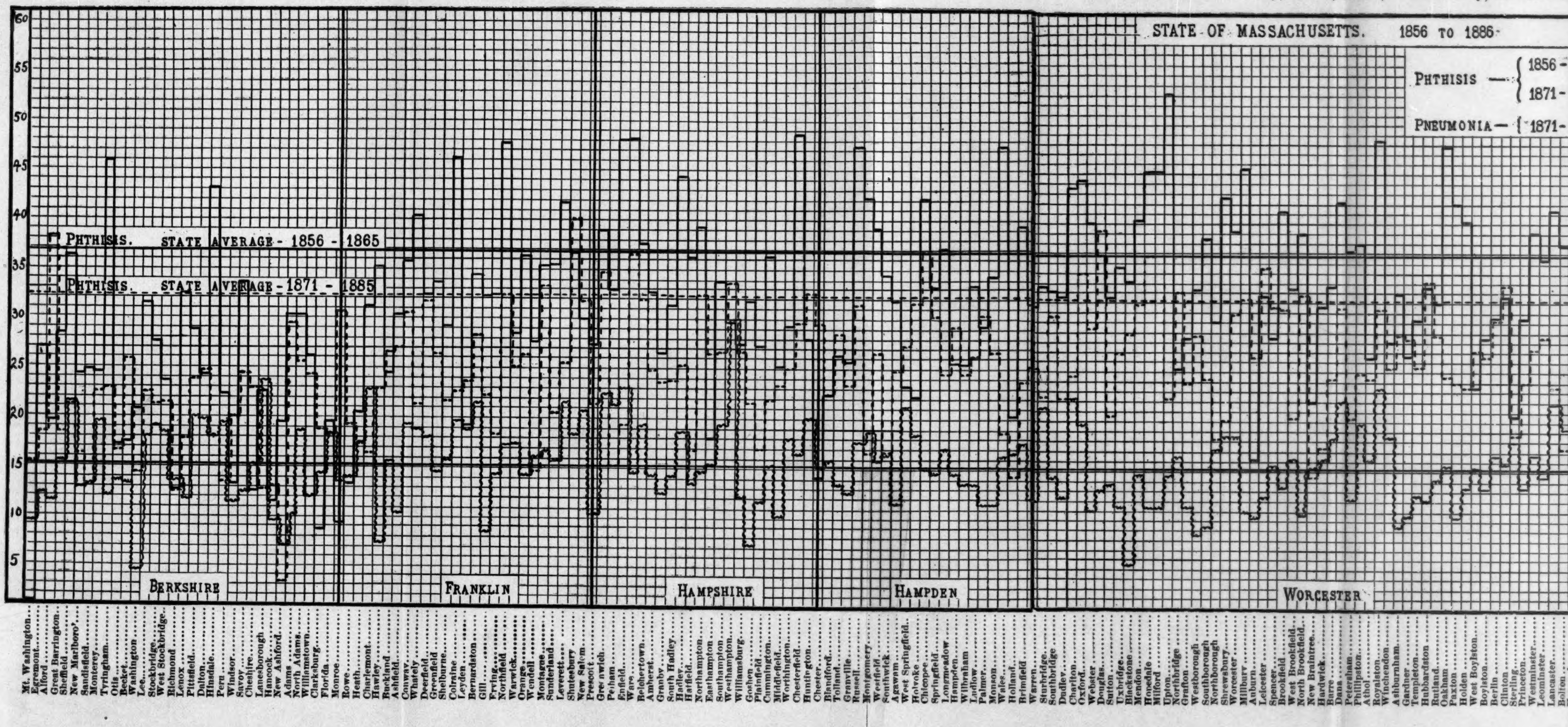
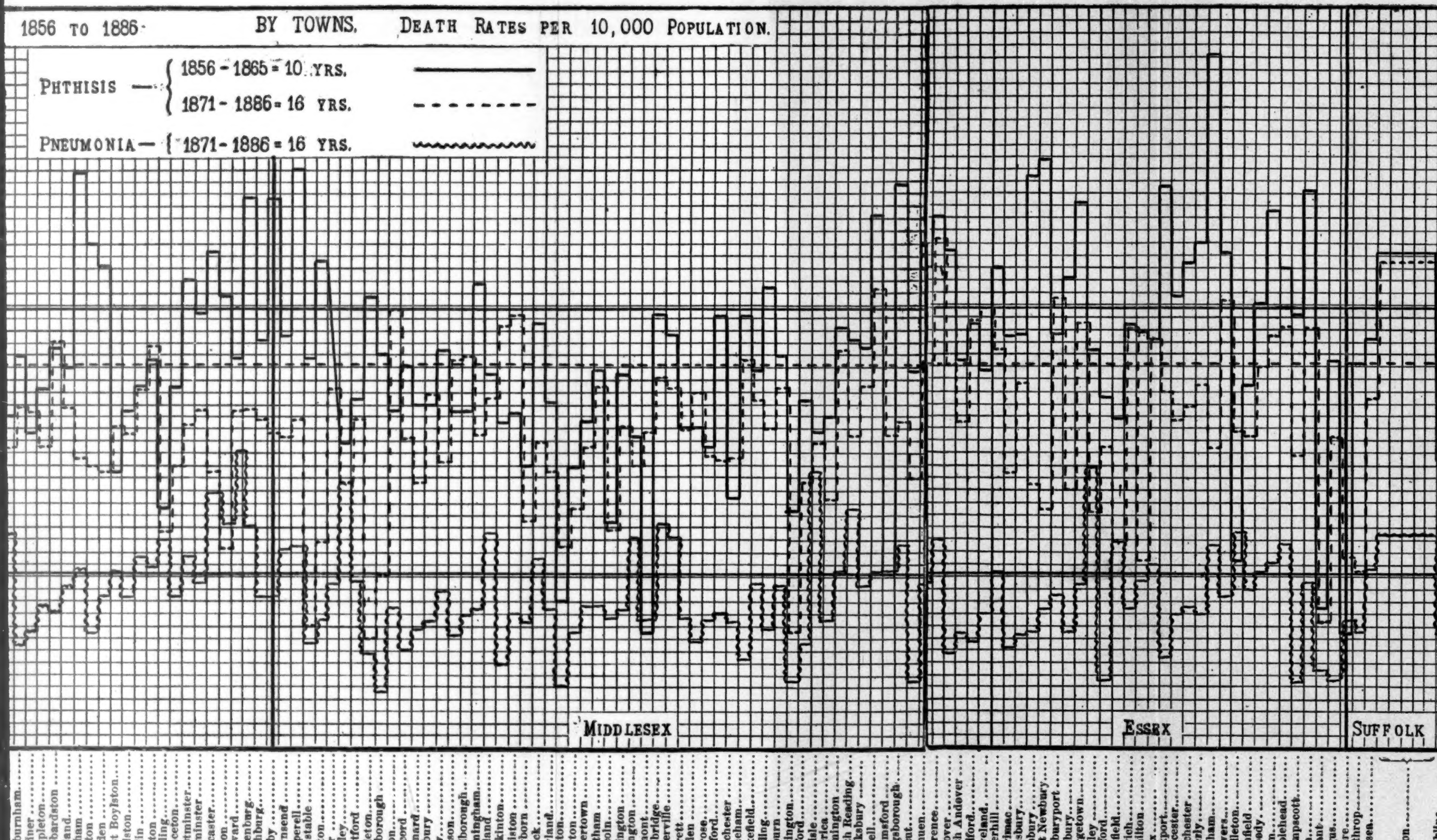


CHART 1. COMPILED FROM MASSACHUSETTS REGISTRATION REPORTS.

in Dukes County) have been excluded from the Chart because their records do not appear to warrant any comparative or deductive study in common with the other towns of the State.



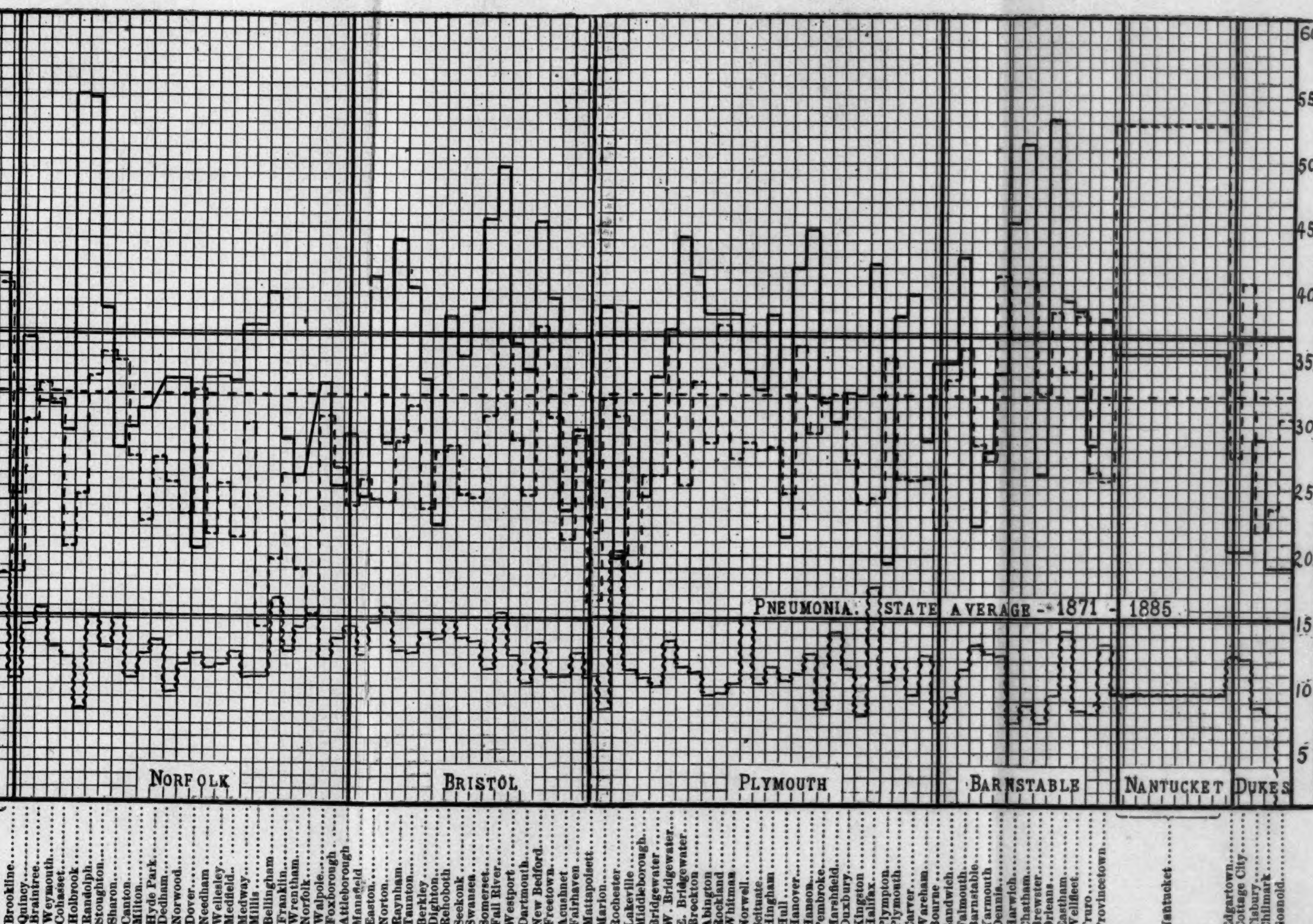
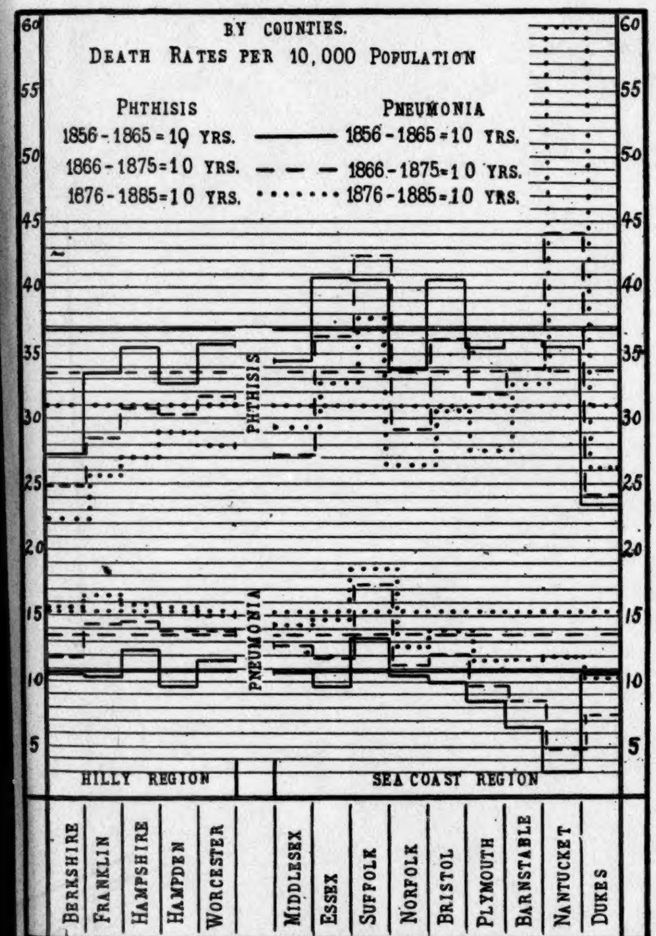

60
55
50
45
40
35
30
25
20
15
10
5
PNEUMONIA. STATE AVERAGE - 1871 - 1885
NORFOLK
BRISTOL
PLYMOUTH
BARNSTABLE
NANTUCKET
DUKES
Brookline
Quincy
Braintree
Weymouth
Cohasset
Holbrook
Randolph
Stoughton
Sharon
Canton
Milton
Hyde Park
Dedham
Norwood
Dover
Needham
Wellesley
Medfield
Medway
Millis
Bellingham
Franklin
Wrentham
Norfolk
Walpole
Foxborough
Attleborough
Mansfield
Easton
Norton
Raynham
Taunton
Berkley
Dighton
Rehoboth
Seekonk
Swansea
Somerset
Fall River
Westport
Dartmouth
New Bedford
Freetown
Acushnet
Fairhaven
Mattapoisett
Marion
Rochester
Lakeville
Middleborough
Bridgewater
W. Bridgewater
E. Bridgewater
Brockton
Abington
Rockland
Whitman
Norwell
Scituate
Hingham
Hull
Hanover
Hanson
Pembroke
Marshfield
Duxbury
Kingston
Halifax
Plympton
Plymouth
Carver
Wareham
Bourne
Sandwich
Falmouth
Barnstable
Yarmouth
Dennis
Harwich
Chatham
Brewster
Orleans
Eastham
Wellfleet
Truro
Provincetown
Nantucket
Edgartown
Cottage City
Tisbury
Chilmark
Gosnold

CHART 2.

COMPARATIVE STUDY OF PHTHISIS AND PNEUMONIA.

State of Massachusetts.—Three decades, 1856 to 1885, inclusive. Data compiled from Official Records and Registration Reports.



COMPAR
State of Massachu
Data compiled
Average An

CHART 3.

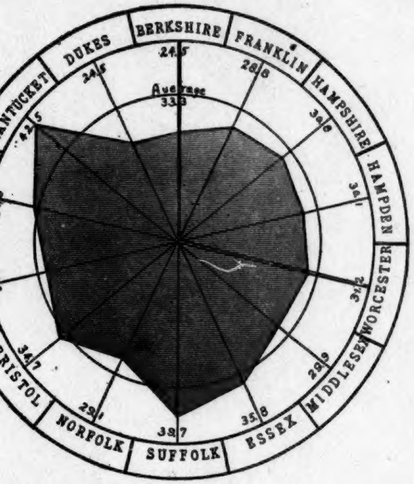
mparative Study of Phthisis and Pneumonia.

achusetts.—By counties, 1856 to 1885, inclusive, 30 years.

piled from Official Records and Registration Reports.

e Annual Death Rate for 10,000 Living Population.

PHTHISIS.



PNEUMONIA.

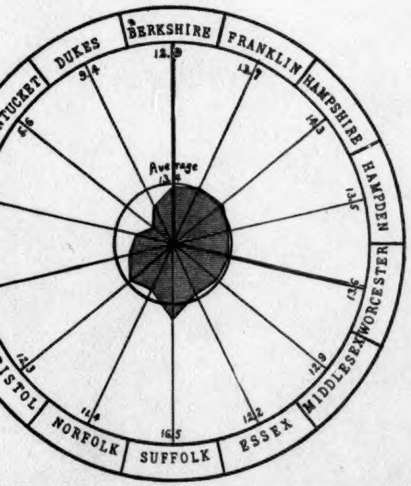


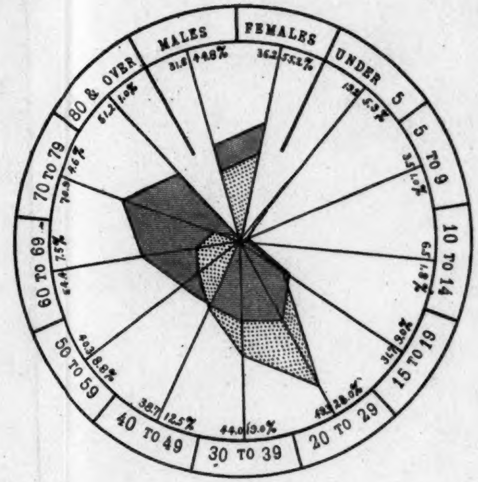
CHART 4.

(See Table No. 1, page 259.)

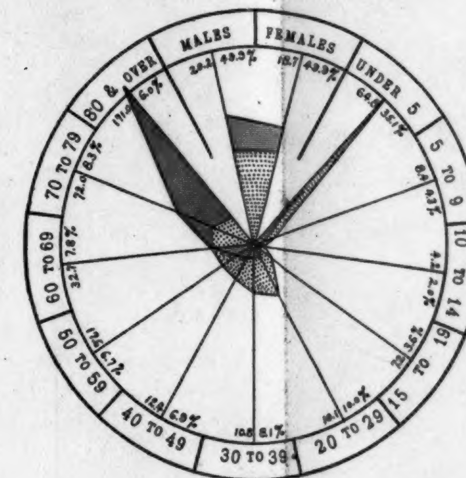
Comparative Study of Death Rates and Percentages of Deaths. By Sexes and Selected Ages.
State of Massachusetts, 1856 to 1885, inclusive, 30 years. Data compiled from Census and Registration Reports.

Death Rates in *shaded* area. Percentages (faulty method) in *dotted* area.

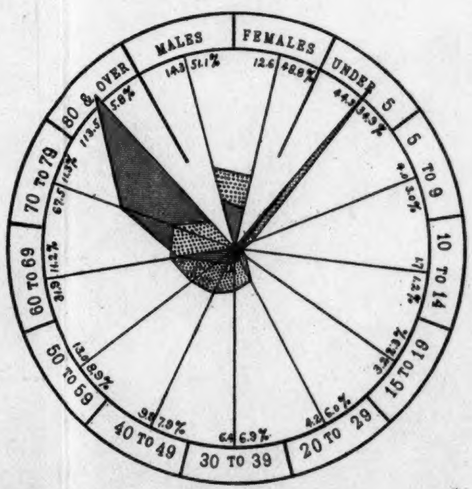
PHTHISIS.



DEATHS "FROM ALL CAUSES."



PNEUMONIA.



Note.—In calculating the percentages, the total number of deaths from the disease under consideration, for the whole period of 30 years, has been regarded as 100 per ct.

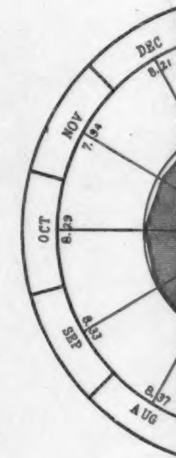
The Death Rates in Phthisis and Pneumonia are the Average Annual Death Rates for 10,000 living population (data of 7 censuses).

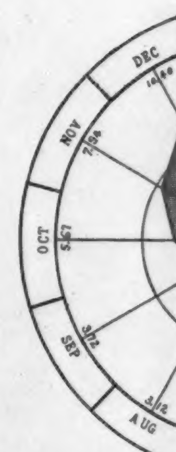
The Death Rates in the figure Deaths "from all Causes" are the Average Annual Death Rates for 1,000 living population (data of 7 censuses). The scale of this figure is therefore one-tenth of the scale used in the other two figures of the chart.

Monthly Mortality (in

State of Massachuse

Data compiled





EUMONIA.
inclusive, 30 years.
ation Reports.
Population.

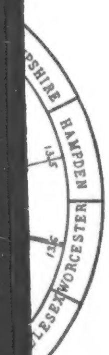


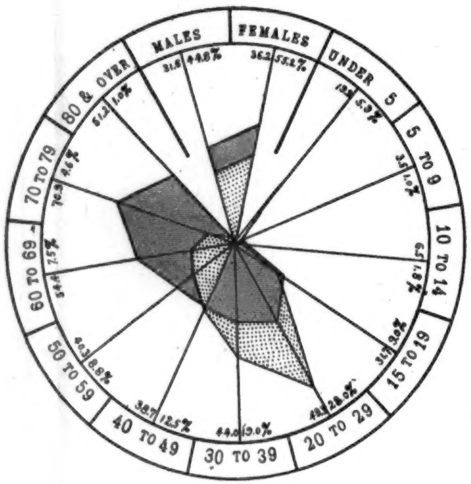
CHART 4.

(See Table No. 1, page 259.)

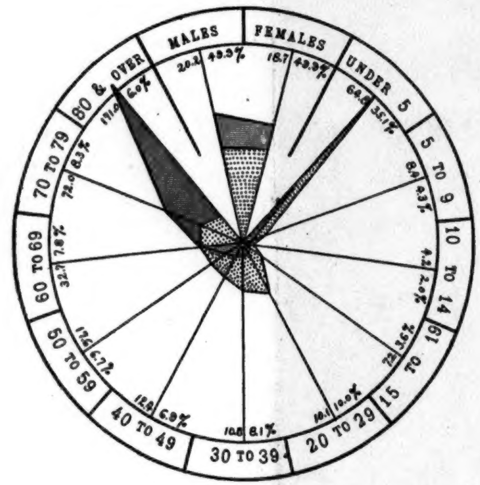
Comparative Study of Death Rates and Percentages of Deaths. By Sexes and Selected Ages.
State of Massachusetts, 1856 to 1885, inclusive, 30 years. Data compiled from Census and Registration Reports.

Death Rates in *shaded* area. Percentages (faulty method) in *dotted* area.

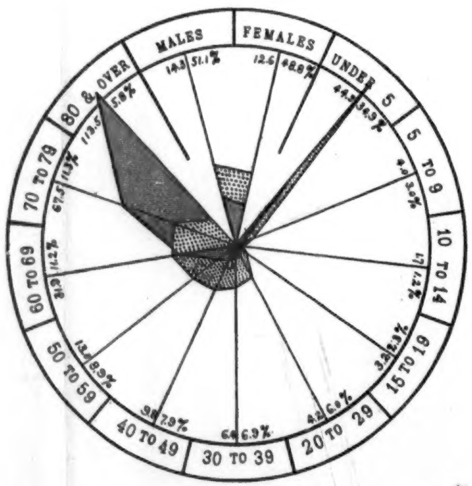
PHTHISIS.



DEATHS "FROM ALL CAUSES."



PNEUMONIA.



Note.—In calculating the percentages, the total number of deaths from the disease under consideration, for the whole period of 30 years, has been regarded as 100 per ct.

The Death Rates in Phthisis and Pneumonia are the Average Annual Death Rates for 10,000 living population (data of 7 censuses).

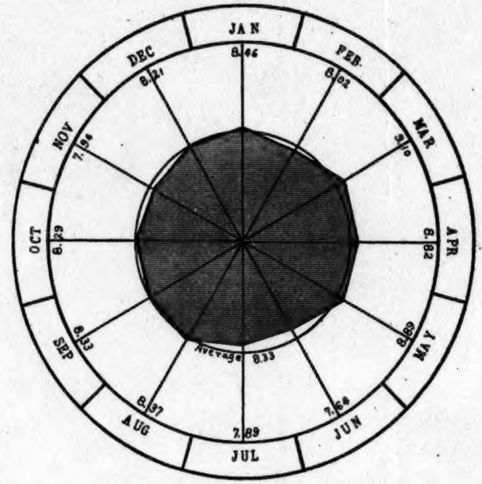
The Death Rates in the figure Deaths "from all Causes" are the Average Annual Death Rates for 1,000 living population (data of 7 censuses). The scale of this figure is therefore one-tenth of the scale used in the other two figures of the chart.

CHART 5.

Monthly Mortality (in percentages), Phthisis and Pneumonia.

State of Massachusetts.—1856 to 1885, inclusive, 30 years.
Data compiled from Mass. Registration Reports.

PHTHISIS.



PNEUMONIA.

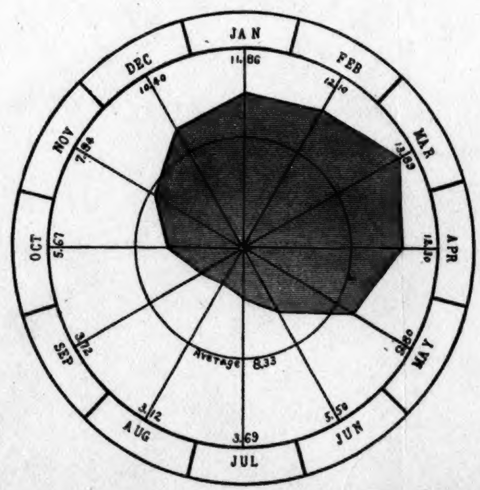
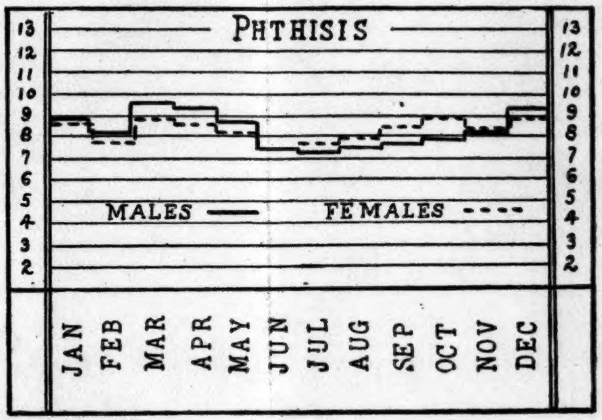


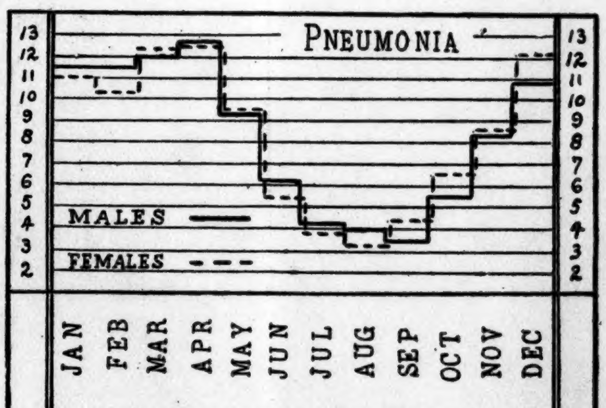
CHART 6.

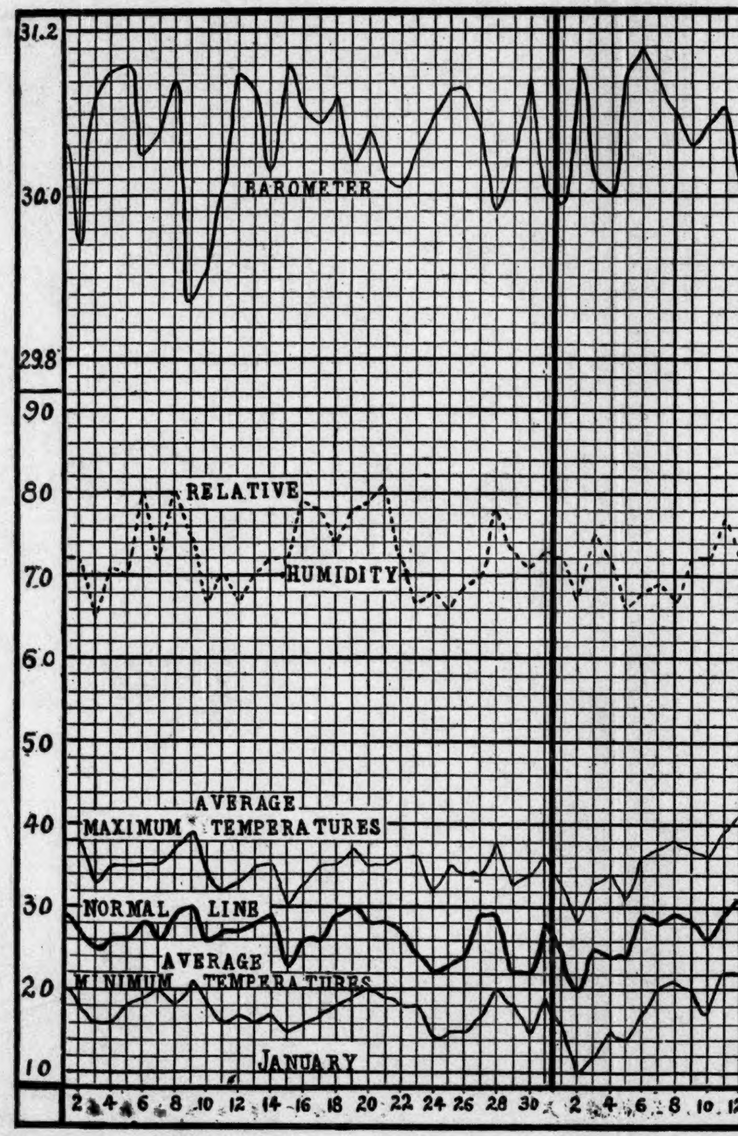
Monthly Mortality of Sexes (in percentages), Phthisis & Pneumonia.

City of Boston.—1871 to 1886, inclusive, 16 years.

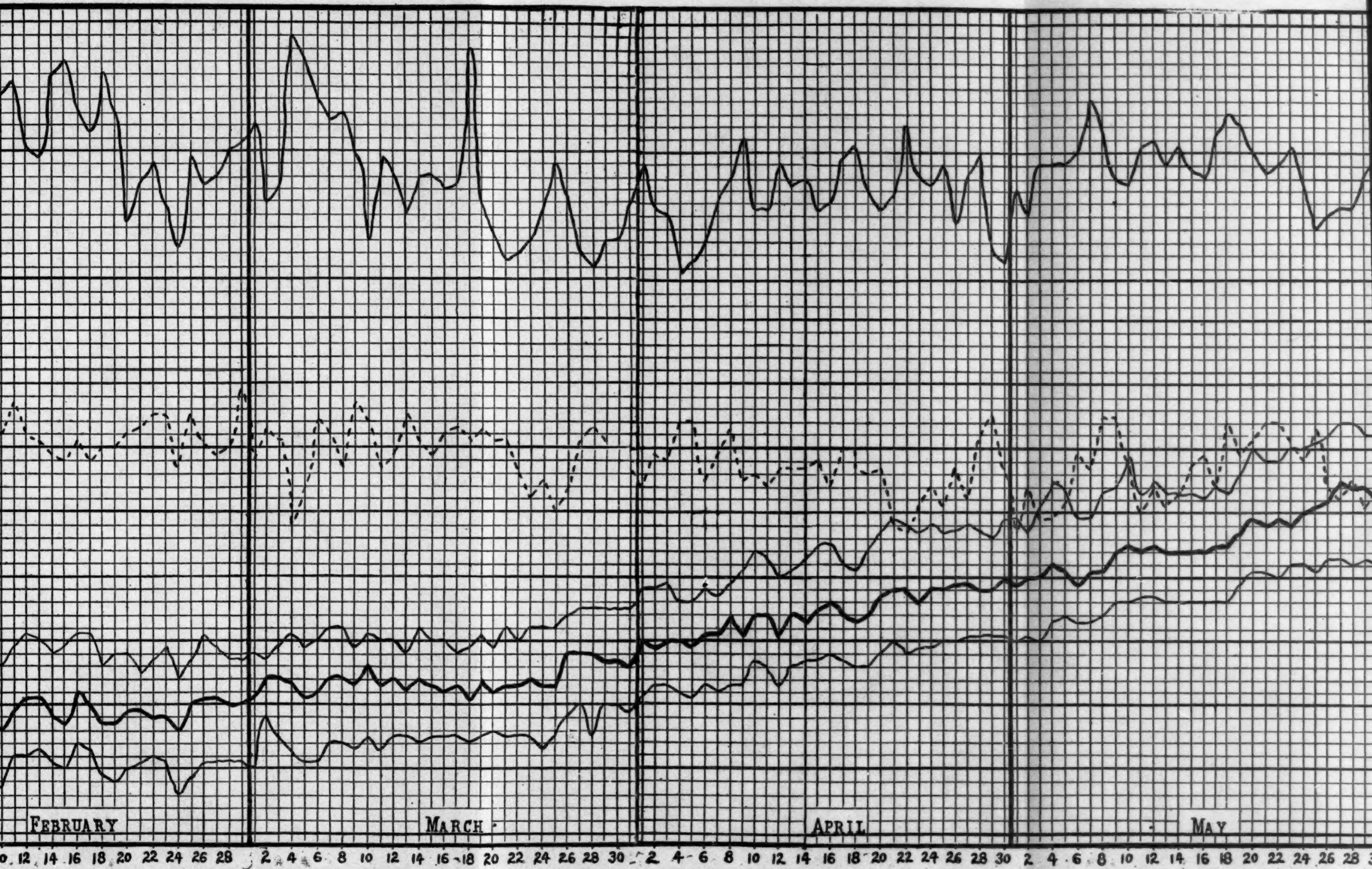
Data compiled from Annual Reports of Boston City Registrar.






31.2
30.0
29.8
90
80
70
60
50
40
30
20
10
BAROMETER
RELATIVE
HUMIDITY
AVERAGE
MAXIMUM
TEMPERATURES
NORMAL LINE
AVERAGE
MINIMUM
TEMPERATURES
JANUARY
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 2 4 6 8 10 12

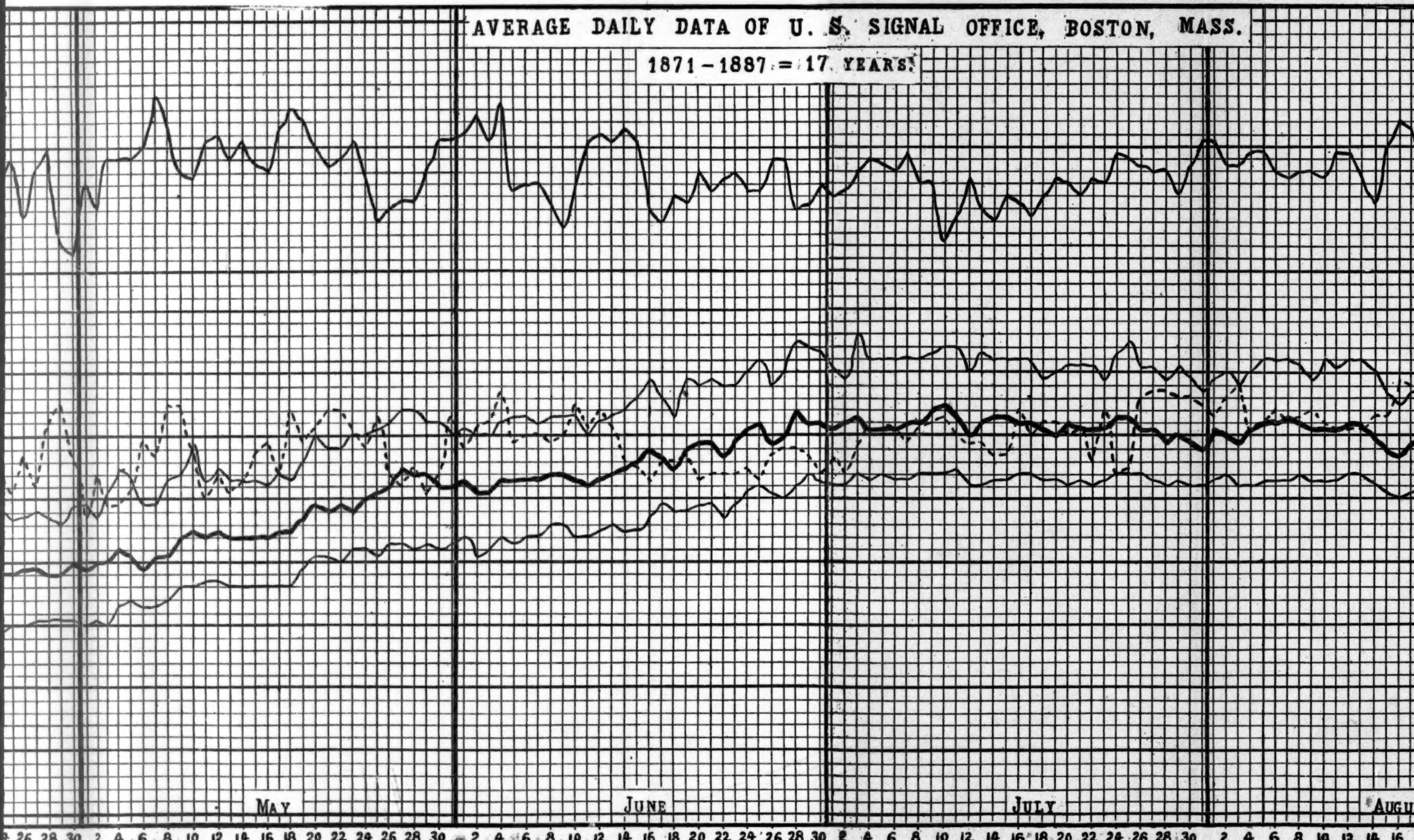
Barometric



FEBRUARY
MARCH
APRIL
MAY
10 12 14 16 18 20 22 24 26 28
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

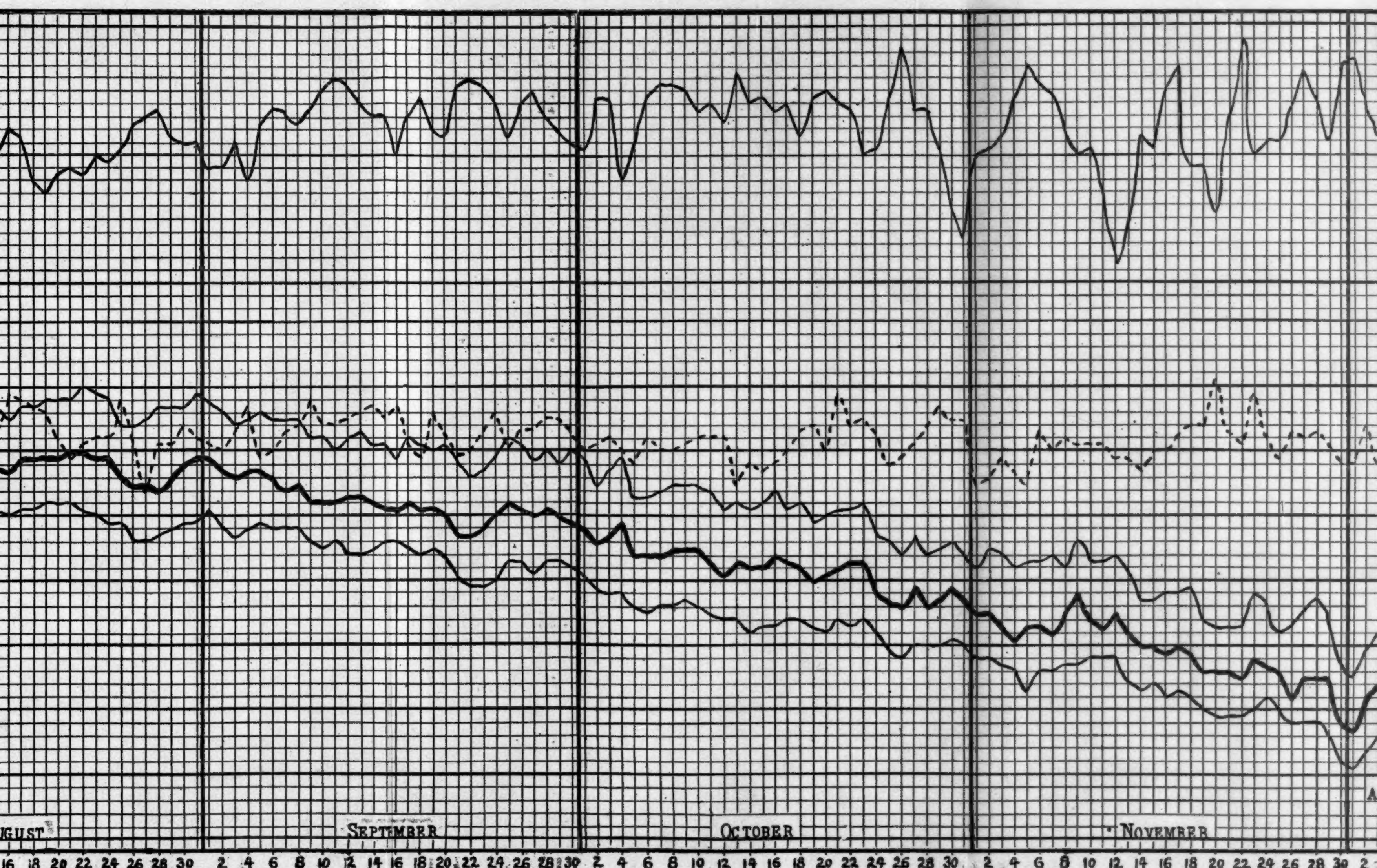
CHART 7.— METEOROLOGY.

Barometric data are expressed in *inches;* Relative Humidity, in *percentages* of full saturation; Temperature, in *degrees* Fahrenheit.
The so-called Normal Line of Temperature is the *mean daily average* of the observations for the 17 years.



NOTE.—The daily averages of Temperature were computed for me by Serg. J. W. Smith and Assistants of the Boston Signal Office, under instructions from Gen. A. W. Greely, Chief Signal Officer U. S. Army. I am indebted to the Signal Officers also for allowing me to compute the Barometric and Relative Humidity averages from the original and official records of the Boston Station.

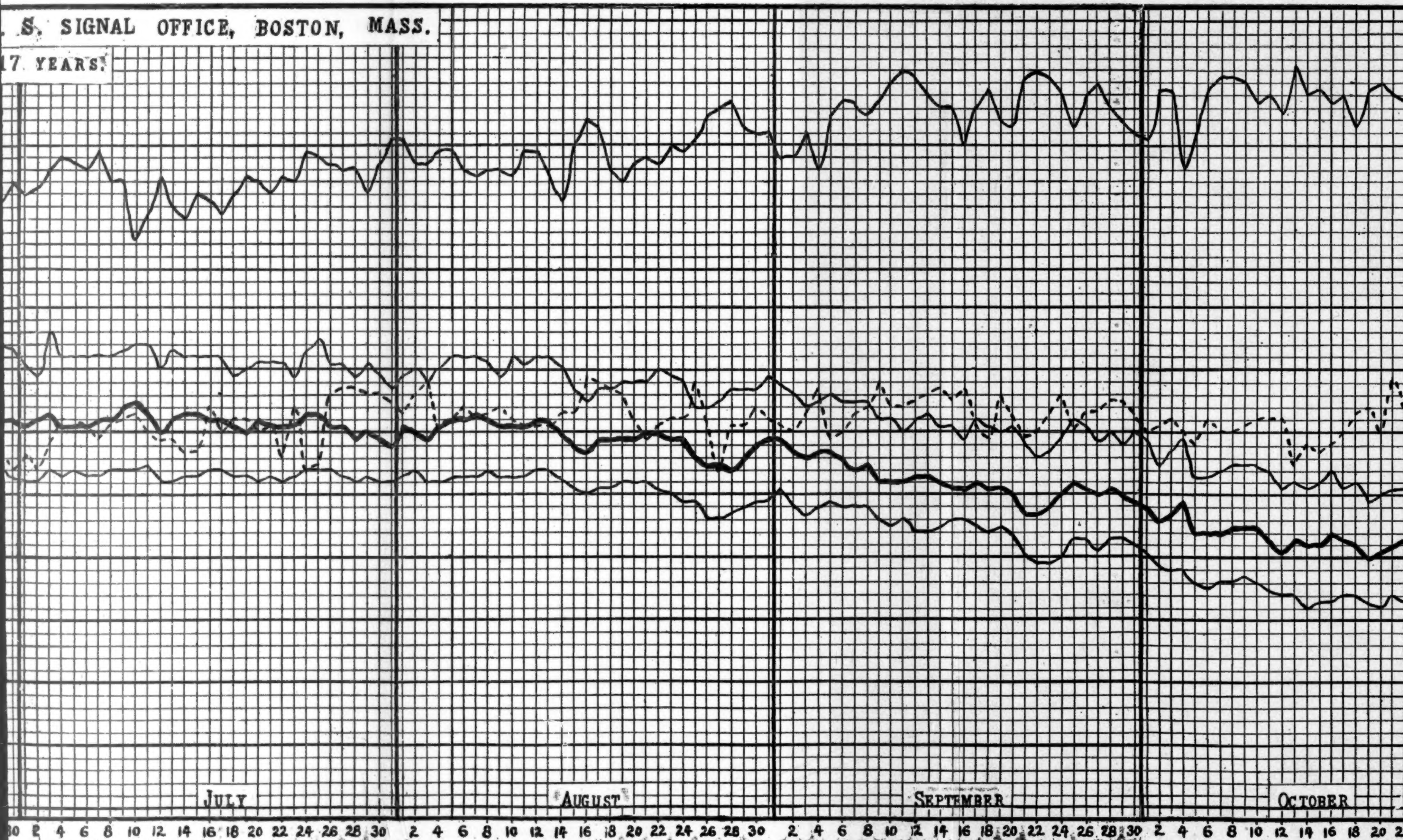
W. EVERETT SMITH, M.D.



GUST
SEPTEMBER
OCTOBER
NOVEMBER
16 18 20 22 24 26 28 30 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 2
A
AV

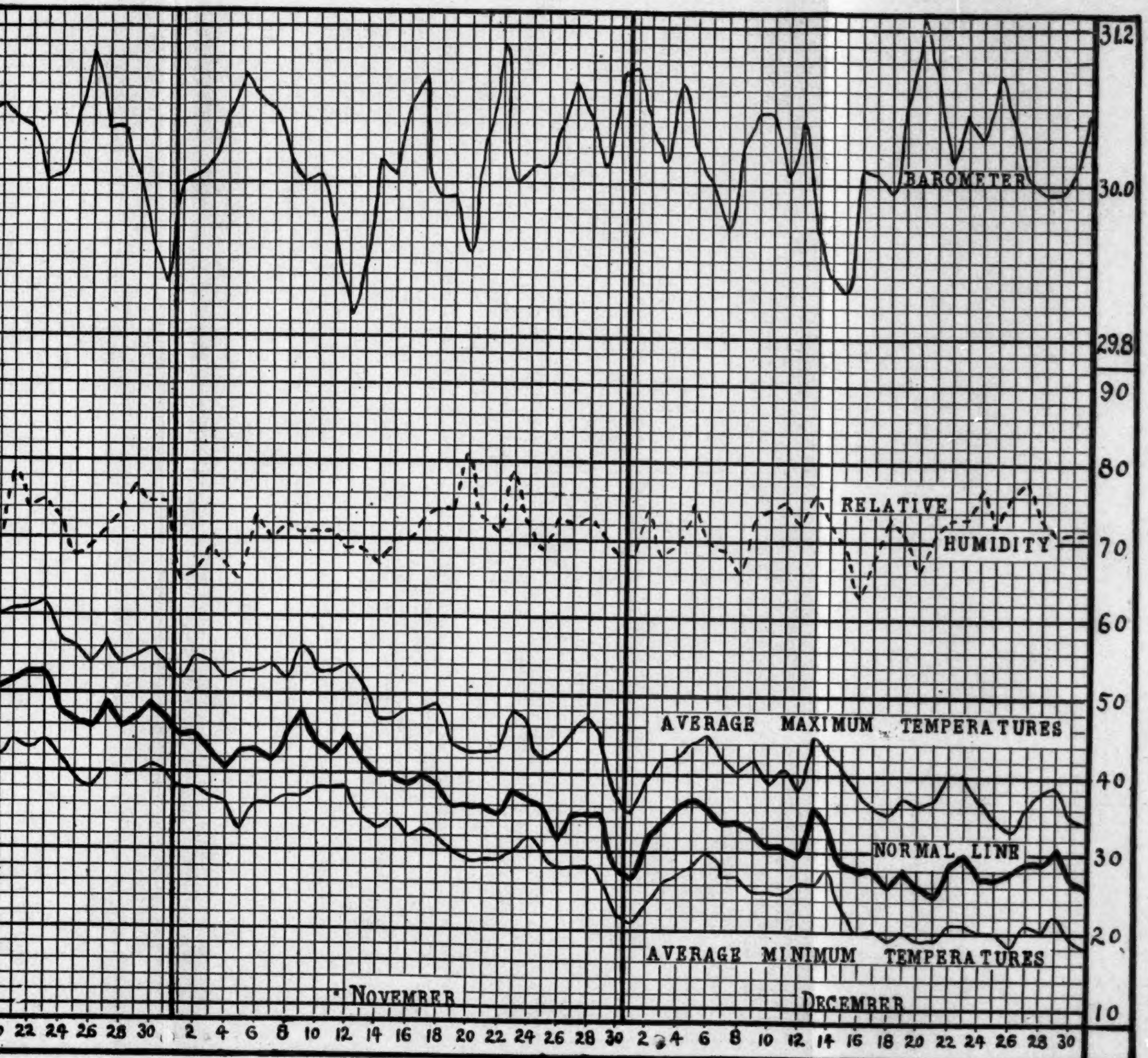
METEOROLOGY.

percentages of full saturation; Temperature, in *degrees* Fahrenheit.
mean daily average of the observations for the 17 years.



e computed for me by Serg. J. W. Smith and Assistants
Gen. A. W. Greely, Chief Signal Officer U. S. Army.
ing me to compute the Barometric and Relative Humidity
e Boston Station.

W. Everett Smith, M.D.


31.2
BAROMETER
30.0
29.8
90
80
RELATIVE
HUMIDITY
70
60
50
AVERAGE MAXIMUM TEMPERATURES
40
NORMAL LINE
30
20
AVERAGE MINIMUM TEMPERATURES
NOVEMBER
DECEMBER
10
22 24 26 28 30 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30

ARTICLE XIV.

OBSERVATIONS ON THE SURGICAL TREATMENT OF MALIGNANT GROWTHS.

By MAURICE H. RICHARDSON, M.D.
OF BOSTON.

READ JUNE 13, 1888.

OBSERVATIONS ON THE SURGICAL TREATMENT OF MALIGNANT GROWTHS.

AT the annual meeting of this Society in June, 1886, Dr. Hodges, in his admirable Address, made the following statement :—"Therapeutics, when not guided by an intelligent and definite purpose, are superfluous and meddlesome. Surgical operations, which, from the outset, it is known cannot be completed, and into which every surgeon remembers with regret that he has been drawn by some vague expectation of benefit—the infiltrating epitheliomata, the adherent and fatally located tumors, the malignant growths sure to return, the limbs crushed in railroad accidents from which he has not withheld his hand—have certainly contributed nothing to the self-satisfaction of the operator or helped to advance even the purely mechanical part of surgery. * * * * * *

"The operation for cancer of the breast was as habitual as it is now exceptional—or at least as it soon will be."

He refers to the Lancet, March 21st, 1885, p. 527, and Jan. 9th, 1886, p. 72. In a foot-note quoting from Verneuil (N. Y. Med. Record, Jan. 9th, 1886, p. 56), "Of one hundred possible operations twenty are imperatively necessary, twenty are absolutely inadmissible, and the remaining sixty may be performed or not, according to circumstances, and surgeons may and do err in each of these classes of cases."

Such an expression of opinion from so eminent an authority in surgery as Dr. Hodges deserves the greatest respect and carries great weight. I certainly agree with him in most of the opinions quoted above. No surgeon can object to the opinion that operations should not be undertaken where the malignant growth cannot be completely removed, if this can be known beforehand, unless it is done for other reasons than the hope of a permanent cure or adding materially to the duration of life.

To the second statement—that the operation for cancer of the breast is now exceptional, or soon will be—I take exception, and I have ventured to present my views on this subject, and to give my reasons, in the following paper, why I believe that the excision of tumors of the breast, as well as of other parts of the body, will become more frequent as well as more successful.

The work necessary for the preparation of a paper based upon the experience of the Massachusetts General Hospital is very great indeed. Last year I began the work of collecting all the cases of malignant disease treated in the Hospital by excision from Nov. 1st, 1877, to Jan. 1st, 1887. Thus far I have collected only the tumors located in the easily accessible parts of the body, and I shall consider in this paper only growths located on the face, lips, lids, scalp, ear, and tongue, the neck and body, the breast, the upper and lower extremities and the external male and female genitals.

I cannot state my belief as to the best treatment of malignant growths better than by quoting from the authority referred to by Dr. Hodges in his paper—(Lancet, Jan. 9th, 1886, p. 72, editorial): "A great risk and a severe operation are only justifiable when the advantage is also great. When for example an operation promises complete cure or long immunity from an otherwise certainly fatal malady, it is obviously right to undertake it, even if it be

severe and dangerous. This is a somewhat self-evident proposition, and yet one of its applications to practice is often lost sight of. Experience has fully shown that, other things being equal, the success of excision of malignant growths is largely dependent upon the period at which they are performed. As, therefore, an early operation for cancer offers a far greater prospect of long immunity from recurrence than a later one, a wide and more severe operation is justified in the earlier rather than the later stage. The contrary view is sometimes acted upon even when not actually stated. Excisions of limited extent are often practised when malignant tumors are small, and because they are small and of recent origin, while in tumors of greater age and more extensive growth more formidable operations are readily undertaken, in spite of the small prospect of success they hold out. The converse should be the rule. When the surgeon has to do with a case in which a free excision holds out a strong hope of long immunity or even a cure, a very thorough operation should be performed, even although it cause some deformity or mutilation or expose the patient's life to danger. The great advantage to be expected from such an operation justifies the greater severity, and the extra risk of such a procedure. Where the object aimed at is the removal of a malignant tumor with the view of interrupting for a time or stopping for ever its growth, the principle should be kept in view, and if it were fully carried out in the early operations we believe the practice would be attended with most favorable results."

Speaking of operations of great severity where it is merely a question of prolonging life, "In all the isolated brilliant achievements of surgeons in this region of practice it is doubtful whether some of these operations have resulted in adding to the sum total of human life; the prolongation of a life here and there does not compensate for the cutting short of that of many others."

I believe that the immediate future will see a great increase in the number of these operations, and very much greater success will follow them, by the recognition on the part of the general practitioner of the vital importance of early diagnosis and excision of all growths situated in those parts of the body especially liable to malignant disease, and by the adoption on the part of the operator of the principle quoted, that it is in the early stage of the disease that the most radical operation should be done.

It is hardly necessary for me to call the attention of members of the Society to the dreadful condition of body and mind to which this fearful disease sooner or later reduces the unfortunate patient. Every physician knows that malignant disease, especially certain forms of carcinoma, is a terrible thing. If left to itself there is a period of life, quite definitely shown by statistical tables, during which the life of the patient is one of dreadful suffering, and he may become an object of loathing to himself and his friends. It is a mercy if this period is shortened by intercurrent disease or by the early invasion of the internal organs.

From a great mass of statistics, we can easily find the average duration of life in different forms of malignant disease, where no operation has been done. We can ascertain in the same way the duration of life in all the great classes of malignant disease where an operation for relief or cure has been done, and it must be acknowledged that in most forms the prolongation of life and the alleviation of suffering do not present a very favorable outlook. But, nevertheless, it does not seem to me that we are justified, in the face of these statistics, in saying that all attempts at cure or relief should, therefore, be abandoned. Probably every physician in this room has had cases, or knows of cases, in which an operation for the cure of cancer has been perfectly and permanently successful. If we can show that there is even a small percentage of complete recoveries, are

we not justified, and is it not our duty, to operate in all cases where there is no definite contraindication as shown below? It is certain that in many cases life is prolonged for years. It is no doubt true, also, that in a certain number of cases life is shortened, but if we analyze such cases we shall find, I think, that in the majority of them the disease was attended by such conditions as would, in my opinion, now render an operation unadvisable.

I would say here, once for all, that cases evidently incurable are not considered at all in this paper. Even in hopeless cases, no one will deny, I think, that operations are sometimes demanded for the relief of pain or the removal of an offensive mass.

It is generally admitted that malignant disease is a local, not a constitutional affection. We must look then for the cause of failure in the operation itself, provided we can show that in a given case there was no invasion of distant organs by the disease which was overlooked. The points to be considered in the following analysis of cases are, first, the thoroughness of the excision, and second, the evidence by which we can decide that an operation is inadmissible.

The cause of the ill-success hitherto met with in these operations is: (1) in early and favorable cases the excision is not thorough; (2) sufficient attention is not given to the existence of glandular infection and metastasis of the internal organs as contraindications.

It is the imperative duty of every surgeon and every practitioner of medicine, to investigate at once every new growth which comes under his observation, with a view to perform the most radical excision as soon as its malignancy has become established, provided, of course, the disease can be thoroughly removed, and provided that there are no contraindications either in the disease itself or in the general condition of the patient. The most favorable time for operation is the very earliest possible after its discovery, and *then*

is the time when a thorough removal promises the best chance for recovery. I am perfectly aware that all these remarks are truisms, but, nevertheless, it seems to me worth while to emphasize them again. Nothing is more common in the experience of every surgeon than to meet with cases of inoperable malignant disease which have been treated for a long time as benign by local applications, constitutional remedies and other methods, while the favorable opportunity for surgical interference has been lost. All cases, for instance, of ulceration of the lip after the age of thirty; all slowly growing tumors of the breast after the age of thirty; the rapidly growing tumors of childhood and youth; in fact, all rapidly growing tumors of all times of life, are of sufficient gravity to make it the imperative duty of the attending physician to take measures to ascertain their nature. It is not right to allow a crust or ulceration of the lip to grow unchecked, or to allow a tumor of the breast to increase until the axillary glands become involved, in the hope that there is nothing malignant in these cases, when we know that by far the greater number of them, after the age of thirty, are malignant, and that a most fearful death awaits the patient, in the course of a short time, if something is not done to prevent it. It is of the greatest importance, then, to recognize at the earliest possible moment the existence and nature of a new growth, no matter how trivial, in any part of the body which is known to be the common seat of malignant disease. A lady of forty-five consults the physician for a small lump which she has discovered in her breast. She is very nervous and much excited, and fears that she has a cancer of the breast. It is the natural wish of the physician to assure her that it is probably nothing, that it has always existed, and will never amount to anything. But do we not by such advice allow the opportune moment to escape? Is not this the time when of all times an operation should be advised and done? The lady presents

herself again, perhaps, for examination, in the course of six months or a year. Resting upon the assurance of the physician nothing has been done; her mind has been at rest, and the gradual enlargement of the growth has excited no fresh apprehension. She is again examined and the axillary glands are found involved. An operation is now advised and performed. The focus of infection which at first was limited to the breast, and which might have been removed most thoroughly, has already extended to numerous points in the axilla. A much more radical operation has become necessary, and her chance for recovery has been diminished. The same experience is constantly met with in ulcerations of the lip. I would, therefore, emphasize most strongly the importance on the part of every physician of early recognition of the nature of all new growths.

When the malignancy of the growth has been established by microscopic examination, and when by the most searching physical examination no extension can be found to exist in the thorax or abdomen, and when the lymph-glands are unaffected, or if involved they are within reach and admit of complete excision, then the operation should be undertaken. But even then the patient should be informed of the serious nature of the disease and the probability of recurrence, before excision should be performed. It is not right to subject any patient to an operation with the assurance that there is no danger of return. He has a right to know the facts before submitting to the necessary suffering, and incurring risk of immediate death. In this way the surgeon and his art will be protected from the criticism, too often true, that harm has been done instead of good, and that life has been shortened rather than prolonged. Such criticisms, no doubt often undeserved and unjust, are very common among the laity, and many have come to me among the responses to my letters. By careful attention to these suggestions, in every case, I am convinced

that not only will many fatal results be avoided, but in the event of recurrence the friends and the patient himself will have no cause to complain.

The operation of excision should never be undertaken unless it is certain that all the growth can be removed,—that is, as an operation for cure. When it has been decided that complete excision is possible, or that it is not impossible, then the growth should be removed with the knife in such a manner as to take with the tumor a broad margin of skin and a deep layer of healthy subjacent tissue, regardless of deformity or mutilation.

The existence of affected lymph-glands, while it is almost a contraindication to the performance of an operation, does not necessarily remove all chances of cure. When they are present they should be removed in the most thorough manner as far as they can be felt, with the surrounding tissues, and with all the parts between them and the tumor through which the lymph-vessels are known to run. I have met with many cases, especially in cancer of the breast, where there has been immunity from the disease for several years, and where the reappearance has taken place in the breast scar rather than in the axilla, after the most thorough dissection of that space.

I have no doubt that it is impracticable to perform as thorough excision as I have recommended, especially in cases of mutilation of the features, yet I am fully convinced that such mutilations in the first operation,—in epitheliomata of the lip and lid for example,—would prevent in a great many cases the horrid deformities which make their appearance in the later stages of the disease.

From Nov. 1st, 1877, to Jan. 1st, 1887, eight hundred and thirty-three cases of new growths were treated at the Massachusetts General Hospital by excision. It is very probable that some of these were not malignant, but by far the greater number were. They embrace all varieties of

malignancy, all ages, and all occupations. Of these eight hundred and thirty-three cases I have recent information in four hundred and ninety-eight. Of the four hundred and ninety-eight, two hundred and fifty-one are living and two hundred and forty-seven are dead.

Of those operated on previous to 1881, there are now living, 38.2%; dead, 61.8%.

Operated upon in 1881	—Living,	52.8%.	Dead,	47.2
" " " 1882	"	45.6	"	54.4
" " " 1883	"	49.2	"	50.8
" " " 1884	"	59.4	"	40.6
" " " 1885	"	61.	"	39.
" " " 1886	"	71.4	"	28.6

I have not included in these returns those cases where I have obtained information not accompanied with that of their present condition. There are many cases where the patient was incurable and where no second operation was done, which would increase the death side of the table very materially.

Taken as a whole these cases present very hopeful results and encourage, I think, the performance of excision as a general rule. If the present practice of more radical excision had been done in all these cases, and if fewer attempts had been made in the now-considered hopeless cases, I have no doubt the showing would have been much better than it is.

First in importance and frequency come Tumors of the Breast, with 274 operations. I have received 163 replies. Of the 163, 68 are living and 95 dead.

Next come Epitheliomata of Head, Neck and Face, with 114 cases, from whom I have received 67 replies, with 34 living and 33 dead.

Tumors of the Extremities, all varieties. 89 cases; 56 replies, 37 living and 19 dead.

Cancer of Lip. 75 cases (not included in Epitheliomata), with 51 replies, 26 living and 25 dead.

Tumors of the Jaws. 40 cases; 20 replies, 11 living and 9 dead. (Not including Epulis.)

Epulis. 20 cases; 11 answers, 10 living and 1 dead.

Penis. 22 cases; 10 answers, 6 living and 4 dead.

Female Genitals. 14 cases; 3 answers, 2 living and 1 dead.

Tongue. 20 cases; 13 answers, 11 dead, 2 living.

Palate. 6 cases; 6 replies, 4 living and 2 dead.

Tonsil. 1 case, living.

Parotid. 11 cases; 5 replies, all living and well.

Melanotic Sarcomata. 10 cases; 8 replies, 1 living and 7 dead. The only living case was undoubtedly a melanotic sarcoma shown by the microscope.

Lymphosarcomata. Besides those cases included in the parts already given, 4 cases; 3 replies, all dead.

Excision of Tumors of the Testicle. 15 cases; replies 9, living 2 and dead 7. The 2 living cases were sarcoma and tuberculosis.

It must be borne in mind that there are quite a number of cases included in these lists which are probably not malignant. It is very unfortunate that there has been no microscopic examination in so many of the older cases. Death from a tumor or recurrence is sufficient evidence, however, of the malignancy of it. It has been impossible for me to go over all the cases and make the proper eliminations, except in the tumors of the breast, so that the figures and percentages are not as yet correct. They are sufficiently accurate, I think, for me to draw certain conclusions at this time. In a later paper I hope to be able to present the evidence in a more satisfactory form.

First in malignancy and fatality come the few cases of Lymphosarcomata,—all being now dead that have been heard from. Next come the Melanotic Sarcomata, with seven dead out of eight. 87.5%.

Cancer of the Tongue, 84.6% dead.
Tumors of the Testicle, 77% dead.
Tumors of the Breast, 58% dead.
Epitheliomata of Face, etc., 49.2% dead.
Cancer of the Lip, 49% dead.
Tumors of the Jaws, 45% dead.
Cancer of the Penis, 40% dead.
Tumors of the Extremities, 34% dead.
Female Genitals, 33.3% dead.
Tumors of the Palate, 33.3% dead.
Tonsil and Parotid, all living.

While I am perfectly aware that these figures are not entirely reliable and accurate, as showing the percentage of recurrence and death after operations for malignant disease, and are open to criticism because the variety of growth is not given in all cases, yet in a general way they show the comparative malignancy of the various classes and situations, and enable me to emphasize certain facts to which I wish to call attention. We can say, for example, that operations undertaken for the cure of cancer of the tongue, as performed at the hospital during the past twelve years, offer very little chance of success, and the same may be said of the lympho- and melanotic sarcomata. Tumors of the testicle and jaws also present a fearful mortality during that period. On the other hand, tumors of the palate, of the extremities (especially where amputation has been done), and even cancer of the lip and epitheliomata of the face, present much more favorable showings.

There is left the middle and much more important class of tumors of the breast, where the present living percentage of 42 per cent. is encouraging enough to justify renewed efforts in that direction.

Lymphosarcomata.—The results in these operations are too few to base much upon them. I do not believe, how-

ever, that excision of a large number of these glands in the neck will long continue to be good practice. I have done the operation several times, and have removed at one operation forty-five glands from the neck, and within a month as many more from the same boy. I do not believe that it is possible to effect a permanent cure, unless it can be reasonably certain that there are but one or two glands affected, and those within easy reach. I would apply the same general rule to these glands that I would to the secondary infiltration of the axillary glands in carcinoma of the breast, or to that following malignant disease of the extremities, namely, that no operation is justifiable where the glands are beyond easy reach. That is to say, when the infected gland is above the clavicle in breast and arm cases, or behind it in neck cases, or above Poupart's ligament behind the peritoneum in cancer of the genitals or of the lower extremity. In a case of lymphosarcoma, where but one gland is involved, it seems to me that operation is imperative; but in cases where a great mass of glands fills the neck and axilla, I believe that nothing can be expected beyond a possible prolongation of life, and that that is very uncertain.

Melanotic Sarcomata.—The mortality is extremely discouraging in this class of tumor. Most of the cases have affected the lower extremity. In these cases I believe that an early realization of the nature of the case, and the most thorough application of the most radical methods of excision will be followed by more favorable results. Such a case, a melanotic sarcoma of the foot for example, if discovered before any glandular infiltration has taken place, demands amputation at once. The tendency of this disease to glandular complications and internal metastases will always make the failures large. In this as in other forms of malignant disease to be considered, the ideal operation cannot be performed because of the very natural objection on

the part of the patient to a sacrifice so out of proportion to the apparent necessities of the case. Yet it seems to me that the facts demand that the very most radical measures be selected to meet the dangers of early internal infection in the melanotic sarcomata.

Cancer of the Tongue.—This is equally discouraging. Of the two cases now living out of a possible thirteen, one was probably not malignant, and the other so small that a wide margin of healthy tissue was left.

No attempt at removal of the tongue is justifiable, judging from these few cases alone, unless the operation is so radical as to leave a wide margin of unaffected parts. I believe that total excision is the only justifiable practice where the tumor is of any extent. The rapidity of growth of this disease makes it very important that it should be recognized early. It should then be most thoroughly removed, even sacrificing the whole organ if necessary, but should not be done, as it seems to me, where there is the additional complication of invaded cervical glands. That adds, I think, the deciding element.

Of the eleven cases heard from, nine are dead. One of the living should be excluded. The other living case was operated upon in 1884, and the tumor was very small and easily excised. One of the deaths followed the operation, one occurred at the end of three months, one at four, one at five, one at six, one at twelve, one at fourteen, two at twenty, and one uncertain. The average duration of life was ten and a half months. It can hardly be said that life has been prolonged in these cases to any considerable degree, certainly not enough to justify the operation.

In such cases as these it seems to me that true conservatism demands that very few of them be touched, but when an operation is done it should be of the most thorough and formidable character. Removal by any other means than

the knife, or, the growth being located near the tip of the tongue, the écraseur or the ligature, is not to be thought of for purpose of cure.

Tumors of the Testicle.—Next in death rate come tumors of the testicle. Seven out of nine are now dead. Of the living, one was probably tuberculosis, and the other a large-celled sarcoma. One died from the operation, one in two months, one in four, one in five, one each in nine, eleven and fifteen months. This is a very unfavorable showing, yet excision seems to be the duty of the surgeon, with the usual care in the consideration of the contraindications. The cord should be ligated as high up as possible, and any glands in the groin removed. The presence of glands affected beyond Poupart's ligament of course contraindicates the attempt.

Epitheliomata of Face and Scalp.—

Cases, 114.	Heard from, ...	67
	Not heard from, . .	47
Living, 34.	Without recurrence, .	22
	With recurrence, . .	12

1878.	Cases, 8.	Living, 1.	Dead, 7.	1 at 24 m.	
				1 at 84 m.	
				1 at 84 m.	
				1 at 10 m.	
				1 at 96 m.	
				1 at 72 m.	
				1 at 12 m.	
1879.	Cases, 5.	Living, 3.	Dead, 2.	1 at 48 m.	no recurrence.
				1 at 84 m.	
1880.	Cases, 14.	Living, 4.	Dead, 10.	1 at 72 m.	suicide.
				1 at 16 m.	
				1 at 12 m.	
				1 at 36 m.	
				1 at 41 m.	
				1 at 84 m.	suffocated by gas.
				1 at 7 m.	
				1 at 7 m.	
				1 at 30 m.	
				1 at 48 m.	

1881.	Cases, 4.	Living, 2.	Dead, 2.	1 at 13 m. 1 at 60 m.	
1882.	Cases, 10.	Living, 4.	Dead, 6.	1 at 29 m. 1 at 5 m. 1 at 12 m. 1 at 31 m. 1 at 72 m. 1 at 13 m.	 old age.
1883.	Cases, 11.	Living, 7.	Dead, 4.	1 at 11 m. 1 at 18 m. 1 at 22 m. 1 at 9 m.	
1884.	Cases, 2.	Living, 2.	Dead, 0.		
1885.	Cases, 6.	Living, 5.	Dead, 1.	1 in hosp.	
1886.	Cases, 7.	Living, 6.	Dead, 1.—	1 at 22 m.	
	67	34	33	Av. 37 m.	

I consider that this is one of the most important classes of cases. The number of operations on these as on many of the other classes has been much greater than the records show, because the milder cases have been treated as out-patients. The high death-rate in my list is due to this fact in part. I have no doubt that the percentage of cures among the out-patients has been very high indeed, because this form of cancer is one of the least malignant at the outset, and most easily cured by proper treatment.

Of one hundred and fourteen cases, I have heard from sixty-seven, of which thirty-four are living and thirty-three dead. One has lived ten years; three, nine years; four, eight years; two, seven years; four, six years; seven, five years; two, four years; five, three years; six, two years.

Of the thirty-three dead, there was no recurrence in four; two of whom died of old age, one was suffocated by gas, and one suicided. The average duration of life was thirty-seven months. One lived ninety-six months, four lived eighty-four, three seventy-two, one sixty months, etc. etc. One died from operation.

The replies which I have received from these cases have shown, in a most graphic way, the terrible ending of life in this form of malignant disease. No other class of cases emphasizes more strongly the importance of early excision, even to mutilation, in the early stages. Certainly no other form of cancer offers greater hope of cure than this, unless it be epithelioma of the lip, when radically excised. I would advocate most strongly the earliest possible excision in all cases where the disease shows a tendency to penetrate to the deeper parts, or to invade such structures as the eye. In the superficial varieties where there is nothing but a scab on the skin, where the disease is hardly more than a keratosis, the curette or the cautery may be used, and in many of these cases such treatment has been followed by cure. But in the deeper kinds, where for example there is a deep ulceration of the inner canthus, I would advise and perform excision so deep and thorough as to ensure a healthy margin, *regardless of* any other parts whatever, even to enucleation of the eye-ball. Here again we have to meet the natural objections of the patient, but our duty is not done till this has been impressed upon his mind. I have no doubt that some of the fatal cases in this list were useless operations. One at least was my own, which I should not for a moment think of undertaking now, where the cheek was extensively infiltrated, but no glands were involved as far as I could make out. Unless a wide margin is sure the disease should be let alone as far as any operation for cure is concerned.

In this connection I would like to say a word in regard to the use of the curette and the actual cautery. In the superficial cases nothing could be more satisfactory than the curette, or perhaps the cautery. Where the deeper layers of the skin have become involved or the subcutaneous tissues, I believe that these methods are worse than useless,—that is, as a means of cure. Both methods must fail of complete

removal, because it is impossible to see and recognize the healthy tissues when they are reached.

Cancer of the Lip.—Probably no class of cases offers a better outlook than this, if taken early, and if thoroughly treated. Of seventy-five cases, most of them severe, I have heard from fifty-one, with twenty-six living and twenty-five dead.

1878.	Cases, 4.	Living, 0.	Dead, 4.	1 at 12 m. 1 at 12 m. 1 at 12 m. 1 at 108 m.
1879.	Cases, 6.	Living, 2.	Dead, 4.	1 at 56 m. 1 at 12 m. 1 at 24 m. 1 at 11 m.
1880.	Cases, 3.	Living, 1.	Dead, 2.	1 at 29 m. 1 at ——
1881.	Cases, 7.	Living, 4.	Dead, 3.	1 in hosp. 1 in 60 m. 1 in 29 m.
1882.	Cases, 5.	Living, 2.	Dead, 3.	1 in 13 m. 1 in 10 m. 1 in 18 m.
1883.	Cases, 6.	Living. 3.	Dead, 3.	1 in 5 m. 1 in 23 m. 1 in 15 m.
1884.	Cases, 5.	Living, 3.	Dead, 2.	1 in 9 m. 1 in 29 m.
1885.	Cases, 4.	Living, 3.	Dead, 1.	—1 in 25 m.
1886.	Cases, 11.	Living, 8.	Dead, 3.	1 in 24 m. 1 in 12 m. 1 in 15 m.
	51	26	25	Av. 26$\frac{5}{23}$ m.
		Died without return,	4	
		Died of original disease,	21	

1878.—0 cases lived 10 yrs. 1879.—2 lived 9 yrs. 1880.—1 lived 8 yrs. 1881.—4 lived 7 yrs. 1882.—2 lived 6 yrs. 1883.—3 lived 5 yrs. 1884.—3 lived 4 yrs. 1885.—3 lived 3 yrs. 1886.—8 lived 2 yrs. Total, 26 cases living. With recurrence, 2; no return, 24.

As in the previous class, but one died from the operation.

The recurrence is very much more likely when the submaxillary lymphatics have been involved. I would not say that such infection is a contraindication, unless there is a large and adherent mass in the neck. The invasion of the jaw, also, makes the outlook very serious. Where, however, the cheek is infiltrated to any extent and the lymphatics below the jaw are invaded, as well as the jaw, it seems to me that the case offers so little hope of permanent cure as hardly to justify an operation.

In early cases it is important to bear in mind that the wider the margin the better the chances of cure, and also that the lip is a very elastic thing. One thinks he is leaving a very wide margin when the lip is stretched, but examination of the shrunken part when it has been excised often shows a very narrow one. I would leave at least half an inch of healthy lip on each side of the V. It is a good rule in this operation as in all others for malignant growths, where it is practicable, to excise the tumor with a wide margin in every direction, and then, and *then only*, consider the question of closing the hole.

Cancer of the Penis.—Cases, twenty. Replies, ten. Living six, dead four. Two are living at eight years, one each at seven, six, five, and three years. One dead in twenty months, and one each in seven, seven, and eight months. One of the dead had circumcision, one curette, and two were amputated. In one of the amputations the inguinal glands were dissected out. In one of the living, amputation followed circumcision. In another, circumcision was done seven years ago. In the remaining four, amputation was done at first.

I believe that all cases of cancer of the penis should be treated by amputation well down to the pubes, except in the most trivial and circumscribed ones. The adoption of

so radical a rule in all cases as early as possible would, in the absence of glandular infection, bring the percentage of cures very high indeed.

As a method of cure I think the curette or cautery a waste of time.

Malignant Disease of the Extremities.—Cases, eighty-nine. Answers, fifty-six. Living, thirty-seven; dead, nineteen.

1 lived 24 m.	1 recurrence at 3 m.
1 " 36 m.	1 " 4 m.
1 " 24 m.	1 " 2 m.
1 " 84 m.	1 " $2\frac{1}{2}$ m.
1 " 4 m.	1 " 9 m.
1 " 4 m.	1 " 20 m.
1 " 12 m.	1 " 4 m.
1 " 37 m.	1 " 1 m.
1 " 6 m.	1 " 4 m.
	1 " 13 m.
Av. duration life, $25\frac{2}{3}$ m.	1 " 36 m.
in 9 fatal cases.	1 " 18 m.
Died from op'n, $\frac{10}{89}$=11.2%	Av. recurrence, $11\frac{1}{2}$ m.

Total died,	19	Living, with recurrence, .	1=1.7%
In hosp. .	10	" without "	35=62.5%
		" with 3 "	1=1.7%
Died subsequently	9		
" " without rec.	1		37
" from orig. disease	8 =14.2%		

It is in this class of cases that we may achieve brilliant results by early and radical operation, and in no other may the failure be more dismal and complete by the use of half-way measures. The same rules of treatment apply here as to other parts, and the same contraindications. What I would urge is the more frequent resort to amputation in those cases which do not admit of satisfactory removal of the part itself. In infiltrating epitheliomata of the hand, sarcomata adherent to the bone, invasion of the lymph glands of

the elbow or the popliteal space, without infection of the groin or the axilla, all forms of malignant disease of the bones,—in all these amputation well above the diseased parts should be advised and performed, if the patient can be made to realize the necessities of the case. An analysis of these fifty-six cases will show most gratifying results of amputations as compared with excisions of the tumors themselves. I have not had time to do this, but reserve it for a future paper.

Cancer of the Breast.—The number of tumors of the breast removed from November, 1877, to January, 1886, has been two hundred and seventy-four. I have received replies from one hundred and sixty-three. Of these, ninety-five are dead and sixty-eight living. Of the sixty-eight living, seventeen were not malignant. This leaves fifty-one living, out of one hundred and sixty-three, 36%. Of the living I have found that eighteen were determined to be malignant by microscopic examination. In nineteen there was recurrence, twelve of which had not been examined by microscope, or at least the examination I have not as yet found. This would make the diagnosis of malignancy in the original tumor certain in thirty cases, — recurrence being even more certain than microscopic examination.

There were twenty-three cases of death from the operation out of the whole number of two hundred and seventy-four, or 8.3%. In the cases of cancer of the breast, from the foundation of the Hospital to 1871, the mortality from the operation was twenty-three in two hundred and ninety cases, or 7.9%. This at first glance is surprising, for the cases I have collected have all been done since the introduction of antiseptics. But the increased mortality is due to the greater thoroughness and severity of the operation.

The date of recurrence in sixty-two cases is 14.2 months. The longest immunity has been sixty-three months, and the shortest one month.

DEATHS IN CANCER OF BREAST.

Year.	No.	Answer.	No Answer.	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	Living.	Per ct. living 1888.	Per cent. dead within 3 years.
1877	2	1	1	1											0		
1878	35	18	17	4	5	3	1	1	1	0	0	0	0	0	3	$16\frac{2}{3}$	$66\frac{2}{3}$
1879	36	26	10		7	5	3	1	1	2	0	0	1	0	6	23	$57\frac{7}{10}$
1880	27	14	13			1	3	0	0	3	0	0	0	0	7	50	$21\frac{4}{10}$
1881	22	11	11				3	2	1	2	0	0	0	0	3	27	$54\frac{5}{10}$
1882	17	11	6					2	3	1	1	0	0	0	4	36	$54\frac{5}{10}$
1883	33	26	7						5	2	4	2	2	0	11	42	$42\frac{3}{10}$
1884	27	15	12							1	2	1	1	0	10	$66\frac{2}{3}$	$26\frac{6}{10}$
1885	33	19	14								4	3	3	0	9	47	$52\frac{6}{10}$
1886	42	22	20									4	2	1	15	68	32
		163	111	5	12	9	10	6	11	11	11	10	9	1	68		
															Dead, 95		
															163		

Cancer of Breast. 1st Recurrence.

No. 1— 5 m.	No. 22— 8 m.	No. 43—30 m.
2— 4 m.	23— 3 m.	44—17 m.
3— 2 m.	24—12 m.	45—48 m.
4—63 m.	25—29 m.	46— 6 m.
5—38 m.	26—24 m.	47— 9 m.
6—24 m.	27— 6 m.	48—60 m.
7— 6 m.	28—29 m.	49— 3 m.
8— 5 m.	29—41 m.	50— 6 m.
9— 7 m.	30— 3 m.	51— 4 m.
10—48 m.	31— 2 m.	52—23 m.
11— 2 m.	32— 6 m.	53— 1 m.
12— 8 m.	33—30 m.	54—12 m.
13—60 m.	34— 8 m.	55— 2 m.
14—10 m.	35— 1 m.	56— 7 m.
15— 4 m.	36—30 m.	57— 4 m.
16— 6 m.	37—24 m.	58— 1 m.
17— 8 m.	38— 6 m.	59—10 m.
18— 5 m.	39—12 m.	60—16 m.
19— 3 m.	40— 5 m.	61— 1 m.
20— 3 m.	41—12 m.	62— 5 m.
21—12 m.	42— 3 m.	
		882 m.

Longest period of recurrence, .	63 m.
Shortest " " " .	1 m.
Average " " " .	14.2 m.

Cancer of the breast I have considered first in importance from the greater number of cases. From the tables it will be seen that the number of operations has not diminished during the past ten years. During 1887 and 1888, the number has been larger than ever before, and I venture to assert that the results will be more favorable. It does not seem to me justifiable to say, even in the face of these imperfect statistics taken from the Massachusetts General Hospital, many of them in Dr. Hodges's own service, that the operation is not successful enough to warrant renewed efforts, or that the operation is or is likely to be a thing of the past.

LIVING CASES.

No.	DATE.	Microscopic Examination.	Cancer.	Sarcoma.	Recurrence.	Time.
1	1878	No	Yes		No	10 yrs.
2	1878	No	Yes		No	10 yrs.
3	1879	Yes		Yes	2	9 yrs.
4	1879	Yes		Yes	3	9 yrs.
5	1879	No	Yes		2	9 yrs.
6	1879	No	Yes		No	9 yrs.
7	1879	No	Yes		No	9 yrs.
8	1880	No	?	?	No	8 yrs.
9	1880	Yes	Yes		6	8 yrs.
10	1880	No		Yes	No	8 yrs.
11	1880	No	Yes		Yes	8 yrs.
12	1880	No	Yes		No	8 yrs.
13	1880	No	Yes		No	8 yrs.
14	1881	No	Yes		Yes	7 yrs.
15	1881	No	Yes		No	7 yrs.
16	1882	No	Yes		Yes	6 yrs.
17	1882	Yes	Yes		No	6 yrs.
18	1882	Yes	Yes		Yes	6 yrs.
19	1883	Yes		Yes	No	5 yrs.
20	1883	No	Yes		No	5 yrs.
21	1883	Yes		Yes	No	5 yrs.
22	1883	No	Yes		No	5 yrs.
23	1883	No	Yes		Yes	5 yrs.
24	1883	No		Yes	No	5 yrs.
25	1883	No	Yes		Yes	5 yrs.
26	1883	Yes	No	Yes	No	5 yrs.
27	1883	No	Yes	No	Yes	5 yrs.
28	1884	No	Yes	No	Yes	4 yrs.
29	1884	No	Yes	No	No	4 yrs.
30	1884	No	Yes	No	Yes	4 yrs.
31	1884	No	Yes	No	No	4 yrs.
32	1884	No	Yes	No	Yes	4 yrs.
33	1885	No	Yes	No	Yes	3 yrs.
34	1885	Yes	Yes	No	No	3 yrs.
35	1885	Yes	Yes	No	No	3 yrs.
36	1885	No	Yes	No		3 yrs.
37	1885	Yes	No	Yes	No	3 yrs.
38	1885	Yes	Yes	No	3	3 yrs.
39	1885	No	Yes		No	3 yrs.
40	1886	Yes		Yes	No	2 yrs.
41	1886	No	Yes	No	No	2 yrs.
42	1886	No	Yes		Yes	2 yrs.
43	1886	No	Yes		No	2 yrs.
44	1886	Yes	Yes		Yes	2 yrs.
45	1886	No	Yes		No	2 yrs.
46	1886	No	Yes		No	2 yrs.
47	1886	Yes		Yes	No	2 yrs.
48	1866	Yes	Yes	No	Yes	2 yrs.
49	1886	No	Yes		No	2 yrs.
50	1886	Yes	Yes		Yes	2 yrs.
51	1886	Yes	Yes		No	2 yrs.

The percentage of deaths from operation is not large. Even with antiseptics, it seems to me that some must necessarily occur. The deaths from preventable causes have been surely diminishing. The operation, as it ought to be done, is a formidable one, but with a mortality of only eight per cent. it is not sufficiently great to weigh against the large percentage of permanent cures which is I believe sure to result from increased thoroughness of removal.

At my first operations on cancer of the breast in 1880 I determined to attempt to perform this operation in the most thorough and radical manner, especially as regards the axilla. I have since operated in about sixty cases. The results I do not know except in a few cases done at the Massachusetts Hospital. In these the percentage of living has been large, and I think it is due to the method of dissecting the axilla. In all the cases where the disease has returned it has appeared in the scar of the breast and not in the axilla.

The method I have adopted, though there is so far as I know nothing new in it, is to make such a dissection of the axilla as I have made in the dissecting room. The incision is carried from the breast along the edge of the *pectoralis major* across the axilla and down the arm directly over the axillary vein. All the tissues down to the *serratus magnus* are removed with a knife by a clean dissection so as to take out all the lymphatic vessels. The axillary fat is then incised, and the axillary vein found and fully exposed as a land mark for future dissections, on the ground that the vessel is most easily avoided when its position is shown in full view. The aponeurosis which holds in the axillary fat and is attached to the coracoid process, is next incised freely, which allows free dissection with the scalpel in and around the axillary structures. The fat can be separated from the vessels and nerves by clean incision till the whole is removed. I have never made this dissection in any case

where I have not found some of the glands affected, even when nothing could be felt on the outside. The investigations of Dr. Whitney have also shown that this mass of fat contains, or may contain, clusters of cancer cells wholly independent of the glands, even when the glands themselves are not visibly affected. Other observers have found the lymphatics affected with malignant disease, even when not perceptibly enlarged.

These investigations alone show the necessity of dissecting out the axilla in all cases. There is no doubt that this method adds to the danger as well as to the discomfort and impairment of the arm. Dr. Mixter has advocated a little different incision, namely to carry the axillary cut well up on the *pectoralis major* so as to close the axilla by untouched skin, which he fastens deeply to one of the serrations of the *serratus magnus* by means of a deep stitch. I have had little experience with this method, but it is claimed for it that there is little or no impairment of the movements of the arm afterward.

There is no doubt that this method, which ought to be followed in all malignant tumors of the breast, makes the operation a most formidable one. It is not an easy task to remove all the fat from the axilla without wounding any of the important structures it contains. Wounding the axillary vein is the greatest danger as regards immediate results, and is generally fatal in a short time. There is not so much danger of injury to either artery or nerves. There is, nevertheless, little excuse to be offered for cutting so large and prominent a vessel as the axillary vein, if the operator has ordinary skill and experience with the knife.

I do not agree with those writers who say that dissection of the axilla does not add to the dangers of the operation. It seems to me as absurd as to say that amputation of the thigh is no more dangerous than that of the leg. I have no doubt that it increases the mortality fully fifty per cent.

Another point in the operation of the greatest importance is the removal of plenty of skin over the tumor. I agree with Gross (Am. Jour. Med. Sciences) that the skin over the whole breast should be removed. It is here that the recurrences have taken place in all my cases, where any has appeared at all. I feel the importance of this method so much that I am almost inclined to say that in cases where the whole breast is involved and where enough skin has been left to make a first intention possible, the operation has not been radical enough. I have several cases in mind where there has been long immunity, in which the wound healed by granulations entirely. One of the last cases I saw was found to have cancer infiltration in the skin outside the cut before the patient left the table, shown by fresh section and microscopic examination.

I would not operate in a case where there was infiltration of the skin to any extent, or where glandular infiltration could be detected above the clavicle, or where the axilla was filled with a large adherent mass of glands. Where internal organs are shown to be diseased, or the general condition of the patient is bad, I would not of course interfere.

I do not agree with Butlin (The Operative Surgery of Malignant Disease) as to the partial removal of the breast. Where the microscope has shown the existence of cancer I would take away the whole of the gland and the skin over it, as well as everything below it down to the pectoral, and moreover I would take with the gland the tissues about it, especially on the side next to the tumor.

I feel certain that if we follow this method of selecting the cases, especially as I said in the introduction, if we incise every lump in the breast as soon as it is discovered and subject it to the microscope, and when it is malignant if we follow the method I have been advocating during the past eight years, we shall be able to effect a permanent cure in a much larger percentage than hitherto.

In conclusion I would say that I believe we are going to operate by improved methods upon cases much earlier discovered and recognized, and more carefully studied, with very much better results. The average operation is going to be more radical, it will be more thorough and more formidable, and more truly conservative, because it will only be performed when its most radical performance promises the greatest good, namely at the beginning of the disease, and not when the near approach of dissolution has made it, as too often in the past, the most forlorn of forlorn hopes.

ARTICLE XV.

THE VALUE OF CORROSIVE SUBLIMATE AS A PRACTICAL DISINFECTANT.

By WILLIAM B. HILLS, M.D.
OF CAMBRIDGE.

READ JUNE 13, 1888.

THE VALUE OF CORROSIVE SUBLIMATE

AS A

PRACTICAL DISINFECTANT.

It is only within a comparatively few years that the exact nature of infectious material has been determined with any approach to certainty. Previous to this time, our knowledge of the relative value of disinfectants was necessarily very inexact, and their mode of action, although the occasion for numerous theories, entirely unknown. It was assumed, however, that infection had its origin in putrefactive processes. Any substance, therefore, which arrested such processes, or destroyed their chemical products, was considered to possess more or less value as a disinfectant. The only known test of the efficiency of these was their power to arrest decomposition, and this was determined by the presence or absence of odor.

Investigations of recent years, however, have proved as conclusively perhaps as is possible that certain infectious diseases are caused by micro-organisms. Consequently, all processes of disinfection are now based on the view that all such diseases are caused by micro-organisms, or by poisons which are produced by the vitality of such micro-organisms. In the present state of our knowledge, therefore, we consider as disinfectants those substances only which have the power of destroying the vitality of micro-organisms.

When the various substances formerly employed as disinfectants were measured by this test, it was found that nearly

all of them are much less valuable than was formerly supposed; while some, including ferrous sulphate and the salts of zinc, which had for some years been considered of inestimable value, are absolutely worthless. The hypochlorites, which have always occupied a prominent place in the list of disinfectants because of their power to destroy organic matter and the chemical products of putrefaction, were found to be in fact very efficient; though it is probable that, as they had been hitherto employed, they were more often inefficient than otherwise, owing to a lack of any definite knowledge regarding the proper amount to be employed. With this exception, however, the only metallic salt found to have distinct value for practical disinfection was corrosive sublimate. This salt had been recognized for many years as an efficient antiseptic, and had also been included in the list of supposed disinfectants; but it had not been shown, by the tests employed previous to 1880 or thereabout, to have a superiority over other metallic salts of its class, sufficient to compensate for its expense and poisonous properties.

Our knowledge regarding the relative value of disinfectants as measured by their power to destroy micro-organisms dates from the researches of Robert Koch, published in 1881. Koch found that most micro-organisms are destroyed by a solution of corrosive sublimate of the strength of 1:5000; while a solution of the strength of 1:1000 is fatal to all. He also found that corrosive sublimate has a decided superiority over all other substances as an antiseptic. A solution of the strength of 1:1,000,000 had a marked restraining power on the germination of the spores of the *B. anthracis*, for example, while a solution of the strength of 1:300,000 prevented their development. The results of other investigators, while showing that its antiseptic and disinfecting powers are possibly not quite so great as claimed for it by Koch, still confirm the latter so far as to show

that they are considerably greater than those of any other known substance, with the possible exception of one or two other salts of mercury, which for one reason or another are not so available.

As a result of these investigations, and more directly following the recommendations of the Committee on Disinfectants of the American Public Health Association, published in 1885, corrosive sublimate has taken the place, to a large extent, of all other disinfectants, for nearly every purpose excepting aerial disinfection. Every State Board of Health, to whose reports, for the past four or five years, I have been able to obtain access, has published the recommendations of this committee, thus giving them a wide circulation, and nearly every one has distinctly endorsed them as representing the best methods of disinfection known to us. The Board of Health of Maine alone objects to corrosive sublimate, on account of its poisonous properties, and because it forms an insoluble compound with albumen. Figures showing the exact extent to which it is used can be obtained, if at all, only through local Boards of Health, and the reports of these are not easily accessible. There were used, however, in the city of Boston, according to the reports of the Board of Health, in 1884, 850 pounds; in 1885, 1,550 pounds; in 1886, 1,400 pounds; and in 1887, 2,250 pounds of corrosive sublimate for purposes of disinfection.

The value of corrosive sublimate, as measured by its power to destroy micro-organisms in aqueous solutions, is not denied. But the efficiency of a disinfectant, and the amount required for certain disinfection, vary with the nature of the material to be disinfected. The disinfecting power of corrosive sublimate, for instance, is greater in an aqueous solution than it is in an albuminous solution; for in the latter case a part or the whole of the disinfectant unites with the albumen, forming a compound which has little or no

disinfecting power. Thus Klein[1] found that one and the same kind of blood bacillus was completely killed by an aqueous solution of corrosive sublimate of the strength of 1 : 25,000, whereas it remained unaffected by a solution in nutrient gelatine of the strength of 1 : 20,000 of fluid,—or even by a solution in broth of the strength of 1 : 10,000. In all processes of disinfection with chemical disinfectants, we should therefore take into consideration the chemical changes which the disinfectant undergoes when it is added to the material to be disinfected. If we act upon germs in the presence of material which is capable of forming, with the disinfectant employed, inert compounds, it is clear that the germs are likely to escape unharmed, unless we add such a quantity of the disinfectant that it shall be in sufficient excess after the chemical change is complete. Even then we do not attain perfect disinfection, if the inert compounds are such as are able to protect the germs in any way from the action of such excess. This is the case when we employ corrosive sublimate, or any other substance which coagulates albumen, for the disinfection of albuminous material. Under these conditions a coagulum is formed, and germs included within such solid masses may escape destruction and develop later when the material is thrown into the vault or other similar receptacle; for the excess, if any, is in turn converted to inert compounds by the albuminous material, ammonia, sulphuretted hydrogen or other substances with which it there comes in contact, or it is so far diluted as to become inefficient.

Considering corrosive sublimate in connection with these facts, we see no reason for denying that it is an efficient practical disinfectant for certain of the purposes for which it is recommended by the committee on disinfectants, and employed in this and other countries; bearing carefully in mind, however, that its use is for obvious reasons unjustifi-

[1] Report of the Local Government Board, London, 1885-6, page 155.

able unless we can dispose of it in some other manner than through lead pipes. But for the disinfection of the excreta, vomited matters, sputum, etc., of persons sick with diseases known or suspected to be infectious, or for the disinfection of clothing or bed-linen soiled with such material, it is wholly unreliable, and is so recognized by sanitarians abroad. Yet a solution of the strength of 1 : 500 is recommended for these purposes by the committee on disinfectants, and following them, by most of the Boards of Health in this country.

An examination of the report of this committee fails, however, to bring to light the slightest particle of evidence upon which such a recommendation could have been based. The statements made relative to corrosive sublimate are very contradictory and confusing; the biological tests recorded are few in number and very unsatisfactory; and the report as a whole shows evidence of hasty preparation, and is not at all creditable to the committee. A brief review of the alleged evidence presented by this committee in favor of corrosive sublimate will, I think, prove the correctness of this criticism.

It is to be observed, first, that the committee recognize the fact that the quantity of disinfectant required for perfect disinfection depends upon the nature of the material in which the germs are contained,—provided, however, the disinfectant is an oxidizing disinfectant. On page 19 of the report the apparently contradictory results obtained in two series of experiments with potassium permanganate are thus explained. "The wide difference as to the quantity of the disinfecting agent required in the two series of experiments depends upon an essential difference in the nature of the fluid in which the germs to be destroyed were contained. The large amount of organic material present in the blood as compared with that in the culture fluid used in the second series of experiments fully accounts for the difference, for the disinfecting agent is itself destroyed by contact with organic matter."

Also on page 14 we find the following. "The fact that the oxidizing disinfectants are destroyed in the reaction to which their disinfecting power is due, makes it necessary to use them in excess of the amount of organic material to be destroyed, otherwise germs included in masses of material not acted upon would be left intact in a fluid which is no longer of any value for their destruction, and as a few germs may be as potent for mischief as a large number, there would be a complete failure to accomplish the object in view." The committee make essentially the same statement on page 117, and thus conclude: "The only safe rule in the practical use of oxidizing disinfectants is to *use such a quantity of the disinfecting agent that it shall be in excess after the reaction has taken place.*" But if it is necessary to take into consideration the chemical changes which take place in the use of oxidizing disinfectants, why is not the same precaution necessary in the use of all disinfectants? For there is scarcely a substance which has been suggested as a disinfectant, which may not undergo some chemical change, when brought into contact with such organic mixtures as require disinfection; and there is none which is more liable to change than corrosive sublimate. The committee, however, either ignorant of this fact, or forgetting it in their haste, actually use the oxidizing property of the hypochlorites, which makes them the most valuable chemical disinfectants at our disposal (since, if we use an excess, we destroy organic matter and germs at the same time), as an argument against them and in favor of corrosive sublimate, which not only may undergo more changes than do the hypochlorites, but such changes as may render it absolutely worthless.

"For this reason," they say (page 14), "the metallic salts such as corrosive sublimate, which are not destroyed by contact with organic matter, have a superior value for the disinfection of masses of material left *in situ*, such as the contents of privy vaults and cess-pools. In this case, even

if germs enclosed in an envelope of albuminate of mercury, escape destruction, they will be prevented from doing mischief so long as they are included in such an envelope, and the wonderful antiseptic power of the reagent used will prevent their development for a sufficient length of time to ensure the complete loss of vitality of any pathogenic organisms present." It is, however, a well known chemical fact that corrosive sublimate *is* destroyed, or at least undergoes chemical changes, when brought into contact with organic matter. It is immediately converted by albumen to the insoluble albuminate of mercury. For this reason, albumen is recognized as the most efficient antidote in cases of poisoning by corrosive sublimate. Corrosive sublimate in solution is further decomposed by a very large number of other compounds, organic and inorganic, and by unknown constituents of most organic mixtures. There are but few substances whose range of incompatibilities is so wide. The committee apparently admit the possibility of its uniting with albumen, but think we shall, even then, attain perfect disinfection, because the germs will be imprisoned within the envelope of albuminate of mercury, and will *probably* be prevented from developing. But this is not disinfection. Disinfection consists in the *destruction* of disease germs.

Later the committee realize their error and admit the inefficiency of corrosive sublimate for the disinfection of excreta. Sternberg thus writes (page 59), referring to some experiments which show that this substance is not efficient for the disinfection of fresh tuberculous sputum: "The experiments of Schill and Fischer, which I had not read when the recommendation was made (referring to the use of corrosive sublimate for the disinfection of sputum and fæcal discharges), indicate that it will be necessary to use some other agent when the object in view is to destroy the infective virulence of tuberculous sputum. And in general it will no doubt be better to use an oxidizing disinfectant,

such as the hypochlorite of soda, when the germs to be destroyed are imbedded in masses of albuminous material. For such masses are disintegrated and destroyed by oxidizing agents, whereas corrosive sublimate has the opposite effect in consequence of its power of combining with and coagulating albuminous material." And yet, the committee has recommended a solution of corrosive sublimate of the strength of two drachms to a gallon of water as equally efficient with chloride of lime for the disinfection of excreta, vomited matters, and sputum. Sternberg himself in his Lomb prize essay recommends chloride of lime as the most efficient agent for the disinfection of excreta, and recommends corrosive sublimate as efficient for liquid discharges only. But its value for *this* purpose must necessarily depend on the character of the discharges. If they contain albuminous matter in quantity sufficient to form with the disinfectant a coagulum, they cannot be disinfected by it with any more certainty than can solid discharges. The experimental evidence upon which this recommendation is based will be presented later.

The employment of corrosive sublimate for the disinfection of large masses of material such as the contents of vaults, cess-pools etc., is absurd, and would not deserve serious notice were it not for the fact that the report of the committee on disinfectants, recommending it for this purpose, has been so widely accepted. But the committee, in a note inserted after their recommendations were printed, admit that the complete disinfection of such masses is difficult and expensive and probably impracticable; and insist upon the necessity of destroying infectious material before it is thrown into receptacles of this kind. This admission appears however to be based upon impracticability due solely to expense and obvious mechanical difficulties, and not to changes tending to render the disinfectant inefficient. But if a disinfectant is for any reason inefficient for the disinfection of small

quantities of excreta, it is for the same reason inefficient for the disinfection of large quantities. The action of corrosive sublimate upon albumen is therefore a fatal objection to its use for this purpose. But such decomposing masses are constantly disengaging ammonia and sulphuretted hydrogen, both of which convert corrosive sublimate into insoluble compounds, and, owing to the high atomic weight of mercury, these gases fix comparatively large amounts of this metal.

Decomposing excreta also contain alkaline carbonates, phosphates, urea, and doubtless many other substances which react with corrosive sublimate and destroy its efficiency; for there is no reason for believing that any of the resulting compounds have any disinfecting power.

It has been suggested, however, that the albuminate of mercury, which is slightly soluble, has germicide and antiseptic powers sufficient to make it superior to all other disinfectants for this purpose, and that this can be relied upon to prevent the development of such germs as are imprisoned within the coagulum of albuminate of mercury. Prof. Vaughan, for instance, considers it probable that the value of corrosive sublimate as a disinfectant is due to the formation of this albuminate; and Sternberg, in the Medical Record for August 1, 1885, affirms positively that the albuminate is a potent germicide, but gives no facts in support of this statement. Klein's experiments, however, suggest that its germicide power is very slight at the most. Admitting, however, that it has such power, the amount redissolved is very small, and this is likely to be converted at once to the inert sulphide by the sulphuretted hydrogen present.

Used as recommended by the committee, corrosive sublimate is a good deodorizer, so far as it goes; but has no more value probably than the ferrous sulphate which it has to a great extent superseded.

If we examine the experimental evidence upon which

corrosive sublimate is recommended as an efficient agent for the disinfection of solid excreta, we find that it comprises ten or twelve biological tests made with pure cultures of micro-organisms, or with broken-down beef-tea, or with semi-solid fæces. Some of these were successful, others were failures. It does not appear to have occurred to the committee that the *nature* of the material acted upon had any influence on the result in the unsuccessful experiments, or that any further investigation was desirable for the purpose of discovering the cause of the failures. But it was assumed that the *quantity* of material was too great for the amount of disinfectant employed, and that if the latter had been added in larger quantity, or if the time of exposure had been longer, the experiment would have been successful. A liberal allowance was therefore made on the side of safety, and a recommendation made accordingly. The evidence upon which corrosive sublimate is recommended for the disinfection of liquid discharges is the following: "The liquid discharges from the bowels of patients with cholera, typhoid fever, advanced tuberculosis, septic diarrhœa, etc., may be fairly compared with our broken-down beef-tea, as regards physical and biological characters." The amount required to sterilize a certain quantity of broken-down beef-tea was therefore determined, multiplied by two, and the product recommended as efficient for the sterilization of an equal amount of liquid fæcal discharge. A recommendation based upon experimental work of this amount and character is not creditable to a committee of the leading Sanitary Association of this country, and is not entitled to the favor with which the one in question has been received.

The importance of the disinfection of excreta, etc., cannot be overestimated. It is conceded that such material must be disinfected before it is thrown into the vault or similar receptacle, because of the impracticability of disinfecting large masses of matter. A disinfectant to be effective must

have penetrating power sufficient to bring it into intimate contact with every portion of the material to be disinfected. Corrosive sublimate does not have this power, owing to its property of coagulating albumen. It should therefore be replaced, if possible, by some agent to which this objection cannot be made. We have such an agent in chloride of lime. It has the power of penetration; it oxidizes and destroys organic matter, and is in addition an efficient germicide, bearing in mind the fact that it must be used in such quantity that it shall be in sufficient excess after the reaction between it and the organic material is complete.

Corrosive sublimate, in a word, though a very efficient disinfectant as measured by its power to destroy germs, is limited in its applications. It can be used for the disinfection of furniture and other articles made of wood or porcelain, or even metal if varnished, the floors and walls of rooms, such parts of ships as can be reached with solutions, the hands and the surface of the body, and clothing and bed-linen if not soiled with discharges; in other words, for the disinfection of surfaces which are not themselves injured by contact with it, or surfaces which do not contain material of such a character as to destroy its efficiency. Its use for these purposes is however very much restricted, because we have no means of disposing of it except through lead pipes.

Objections have been made to it because of its poisonous character. The danger of poisoning however is very slight. The solutions employed are very dilute, and its taste is sufficiently disagreeable to attract attention before an amount sufficient to do any injury has been taken. If the solutions are colored, the danger of mistakes is much lessened. The same objection may be made with equal reason against all the substances which we now recognize as disinfectants. Care is necessary in the employment of all of them, and those entrusted with their use should be informed of their properties, that all necessary precautions may be taken.

There is, however, one process of disinfection with corrosive sublimate to which this objection may with some reason be made. I refer to its use for the disinfection of streets, for which purpose it has been employed by the Board of Health of Boston for the past two years or more. If its use for this purpose is continued, the time cannot be far distant when the beds of the streets will become saturated with various compounds of mercury. All of these, so far as we have any knowledge of them, are violent poisons. Is any danger to be apprehended from continually inhaling, or swallowing, month after month, dust loaded with compounds of mercury? This is a question deserving serious consideration at the hands of the Board of Health. While not claiming that the process is positively a dangerous one, I believe it is one which involves some risks, and one which it is advisable therefore to discontinue.

ARTICLE XVI.

THE ANNUAL DISCOURSE.

STATE AND PREVENTIVE MEDICINE IN MASSACHUSETTS.

BY HENRY P. WALCOTT, M.D.
OF CAMBRIDGE.

DELIVERED JUNE 12, 1889.

STATE AND PREVENTIVE MEDICINE IN MASSACHUSETTS.

MR. PRESIDENT AND FELLOWS
OF THE MASSACHUSETTS MEDICAL SOCIETY:

THE Commonwealth of Massachusetts has bestowed little attention upon matters relating to the practice of medicine, so far at least as the care of disease is concerned.

This Society was organized for the purpose, among other objects, of making "a just discrimination between such as are duly educated and properly qualified for the duties of their profession, and those who ignorantly and wickedly administer medicine." It has therefore encouraged every movement for the improvement of medical education, and has jealously guarded for this purpose that provision of its by-laws which forbids the adoption by its Fellows of any exclusive and, in the light of human progress, necessarily restricted system in the teaching or practice of medicine.

It remains then for the public to decide whether

NOTE.—At an Adjourned Meeting of the Mass. Medical Society, held Oct. 3, 1860, it was

Resolved, "That the Massachusetts Medical Society hereby declares that it does not consider itself as having endorsed or censured the opinions in former published Annual Discourses, nor will it hold itself responsible for any opinions or sentiments advanced in any future similar discourses."

Resolved, "That the Committee on Publication be directed to print a statement to that effect at the commencement of each Annual Discourse which may hereafter be published."

it is for the best interests of the community or not that the right to practise upon human life should be placed in the hands of those having a definitely ascertained knowledge of the human body and its workings.

From motives of self-interest merely our profession has no concern in the question so great as that which any other portion of the community may have. It might fairly enough be assumed that we are benefited by the increase in the injuries of the human body which it is our business to heal. But our profession has never taken that position. We have been interested in the efforts to secure some measure of protection for the ignorant and innocent against the conscienceless greed of the charlatan and quack. We have at times asked for legislation to accomplish this purpose, because we know, as no other part of the community knows, all the facts in the case. In the future as in the past the adroit advocate will employ his well-paid skill to prove that with us it is a matter of self-interest.

In answer to this it seems, however, sufficient to reply that nearly all civilized countries have devised some way of ascertaining and making known the qualifications of those who assume the responsibility of treating the diseases of man; and of giving a measurable security to the ignorant and helpless that he who publicly advertises himself as a doctor has a sufficient knowledge of the structure and functions of the human body in health and disease. It is moreover of the greatest

interest to all, that he who undertakes the treatment of disease should know enough to be able to discriminate between the diseases which begin and end with the sick person, and those which are communicable from one to another.

The peculiar importance of the second class lies in the fact that here are found those diseases which we have been most successful in limiting and preventing.

The Legislature has decided that no person shall in this State practise dentistry without a certificate from a board of registration, recording the fact that the applicant either was engaged in the practice of dentistry at the time the act was passed, or had undergone an examination as to his knowledge and skill in dentistry and dental surgery satisfactory to the board. Possibly it may sometimes seem expedient that the same protection should be given to the body as a whole which is here bestowed upon a part.

Several States in the Union have passed laws for the regulation of the practice of medicine; in a majority of these the laws are not enforced. In a few States, where the laws have had the benefit of the enthusiastic labors of intelligent and active administrators, good has been accomplished by driving out of the State those whom Sir Thomas Brown has designated as "Quacksalvers and Charlatans, whose impostures are full of cruelty and worse than any other, deluding not only unto pecuniary defraudations, but the irreparable deceit of death."

But it is unfortunately true that in the State of Illinois, which has been the leader in this movement, and where also much has been accomplished at the same time in improving the character of medical education, not only in that but in neighboring States,—there has developed in its legislative bodies an opposition to the Registration Board, of so virulent sort that the leaders of this opposition are quite willing apparently to sacrifice their whole system of State preventive medicine for the sake of asserting the inalienable right of the people to be deceived, if they so elect; and this too in a State where the work of the State Board of Health has been of very high character.

While Massachusetts has not yet been willing to adopt any decided regulations of medical practice, she has however dealt quite differently in the relations ordinarily designated as State Medicine. What these now are and should become, will be my topic for the short time during which I can claim your attention.

The State undertakes the care of disease only as a part of the public provision made for the poor, or for a class of the disabled more unfortunate than the poor, the insane. In both instances the care is exercised by humane men and women, educated in schools especially designed for instruction in medicine, by thorough courses of study in anatomy, physiology and pathology, with observation of disease and its treatment in the wards of well-appointed hospitals.

The State then as a whole does not believe that

its dependent classes should be turned over to the care of charlatans and quacks, nor are they dosed with proprietary medicines. The same care is also given to the provision of a proper medical service for the militia.

In exceptional cases, in times of the extended prevalence of epidemic diseases, this State has authorized one of its departments to undertake, if need be, the care of those sick with infectious diseases.

But a far more important exercise of the authority of the State is found in the methods employed for the medical examination of the causes of death, for the registration of vital statistics, and for the prevention of disease. Since the year 1877, the coroner's jury has ceased to exist in this State; and in all cases of suspicious death, the probable cause has been ascertained by educated and competent observers selected from our profession. For three years the results of the examinations made by these officers have been published, and present a body of statistics of great value, which indicate very distinctly in some cases the direction to be followed by legislation.

The law regulating the sale of poisons enacted in 1888, was intended to control the sale of these substances, which the experience gained through the returns of the Medical Examiners had shown to be too easily obtainable; the increase in the number of suicides from poisoning being the undoubted result of the unrestricted sale of the arsenical preparations for the destruction of insect

pests, and the consequent easy way of obtaining this familiar poison.

It would be wise to add to the functions of these officers the duty of certifying to the causes of all sudden deaths, even when there is no suggestion of violence, and to the deaths occurring without the attendance of an educated physician.

Even if it be desirable that there should be no interference with the liberty which it is assumed that every person in Massachusetts should have in selecting his own physician, there are, it seems to me, very grave reasons of public policy which should require, at the hands of a duly educated physician or disinterested officer of the State, an intelligible statement of the cause of every death. A very hasty inspection of the causes of death returned upon death-certificates in any city or town in this State, will reveal absurdities and contradictions which may cover crimes, and are, at least, the evidence of the grossest ignorance of the structure and functions of the human body in health and in disease.

When registration of vital statistics was introduced into this State in the year 1842, closely following upon and probably suggested by the English registration law of 1837, a foundation was laid for sanitary legislation.

Notwithstanding the slow progress of our registration towards scientifically accurate methods, it has contributed very much to the honorable position early taken and maintained by this State, in the cause of preventive medicine. Registration

is recognized the world over by responsible authorities as the only sure basis of sanitary legislation. Almost without exception the evidence drawn from these public and impartial records has been sufficient to convince any legislative committee charged with the consideration of public health measures. This evidence must naturally be susceptible of clear demonstration; and we shall all probably admit that in medicine, as in the other natural sciences, our anticipations of results, however useful, however indispensable they may be to the practitioner of medicine, however strong the individual's belief as to their certainty may be, still they have not that general acceptance among physicians even, which should precede legislation.

The present discussion as to the communicability of tuberculosis may be used in illustration. Many here undoubtedly believe that the experimental work inaugurated by Koch has shown that many of the conditions surrounding those suffering from this disease, may be controlled, and should be controlled in the interests of the public health. Does it at the same time occur to any one that legislation is desirable in advance of the convictions of the great body of the medical profession,—or that there would be much chance of obtaining the wished-for legal regulation if this general consent of opinion did not exist?

The registration of deaths at least should be regulated and carried out under some competent medical supervision. However valuable the re-

sults may be which have been obtained from the present painstaking tabulation of names and figures on one hand, and faithful editing on the other, the resulting benefit falls far short of what might be effected with competent medical oversight from the beginning to the end of the work.

In the year 1849 a commission was appointed under the authority of this Commonwealth to make a sanitary survey of the State, "with a statement of such facts and suggestions as they may think proper to illustrate the subject." The commission thus constituted prepared a report which justly ranks with the best sanitary reports of that day. They introduce their statement with the following words:—

"We believe that the conditions of perfect health, either public or personal, are seldom or never attained, though attainable;—that the average length of human life may be very much extended, and its physical power greatly augmented;—that in every year, within this Commonwealth, thousands of lives are lost which might have been saved;—that tens of thousands of cases of sickness occur which might have been prevented;—that a vast amount of unnecessarily impaired health and physical debility exists among those not actually confined by sickness;—that these preventable evils require an enormous expenditure and loss of money, and impose upon the people unnumbered and immeasurable calamities, pecuniary, social, physical, mental and moral, which might be avoided;—that means exist, within our reach, for their mitigation or removal;—and that measures for prevention will effect infinitely more than remedies for the cure of disease."

The three commissioners who made this report

were Lemuel Shattuck, Nathaniel P. Banks and Jehiel Abbott. No one of them was a physician; and I have therefore quoted their statement of the province of preventive medicine in order that our profession might be relieved of the public suggestion of making an exaggerated claim for the importance of sanitary science. It cannot be necessary, however, to say more about the claims of public medicine in presence of a body which has itself so unselfishly participated in the work of the prevention of disease, and which has so consistently encouraged those of its members who are more exclusively engaged in this field.

The public statutes contain an amount of legislation which seems to afford ample protection to human life from attacks on any or every side. Boards of health, State and local, appear to be possessed of all the powers to interfere at every period of human life, from birth to death, and even beyond the grave, or at least into it, which it is safe to trust to fallible mortal hands. Not to enumerate the general functions of the State Board, to which allusion will be made later, it may be here said that to the local authorities have been assigned the following powers and obligations:—

The preparation and enforcement of such regulations as they may deem necessary for the health of the people, with reference to house-drainage and sewer connections where sewers exist. They shall make such regulations as seem necessary for the public health respecting nuisances, sources

of filth and causes of sickness within the town, or on board of vessels within the harbor of seaport towns, and respecting articles capable of containing or conveying infection which may be brought into or carried out of the town, and may establish quarantines; and shall provide hospitals for the sick in times of epidemic diseases dangerous to the public health. They shall make inspections of nuisances and causes of sickness, and may destroy, prevent, or remove them as the case may require. They may order the occupants of dwelling houses, which are unfit for human habitation, from any cause, to put them in proper condition as to cleanliness, or to quit them, as seems best. They may make compulsory examination of premises when the public health seems to them to require it. Lands injurious to health by reason of stagnant water are declared to be nuisances to be abated by board of health. Householders and physicians knowing that sick people, for whom they are respectively responsible, are infected with small-pox, diphtheria, scarlet-fever, or any other disease dangerous to the public health, are obliged to immediately notify the board of health of the facts.

These authorities shall also assign places for the carrying on of noxious and offensive trades, or may prohibit them.

The State has also enacted a system of compulsory vaccination and revaccination; has prohibited the sale of unwholesome food and of adulterated food and drugs. It has regulated

the hours during which women and children may labor, and has compelled shop-keepers and manufacturers to make provisions for the protection of the health of those employed by them.

It has recognized the enormous injury to human life caused by the intemperate use of alcoholic drinks; has attempted to regulate such use by appropriate legislation; and has directed that in the teaching of hygiene and physiology in the public schools special instruction shall be given as to the effects of alcoholic drinks, stimulants and narcotics, on the human system. It has provided for the control of contagious diseases among the domestic animals. There might be added to this list many laws which have an influence more or less direct upon health by protecting the body from injury. But this rapid and probably incomplete survey of the State's endeavors to protect life and prevent disease will apparently show that there has been no hesitation in granting extreme powers to the sanitary authorities, and sufficient to meet any emergency.

Yet we know that two at least of the conditions which most seriously threaten life are not controlled as they should be,—a public and private disregard of sanitary cleanliness in the first place; and in the next, the unnecessary and reckless spreading of the communicable diseases, either by ignorance, or through a criminal disregard of the rights of our neighbors. In these directions the laws certainly have promised help.

We find that statutes which ought to be plain

and appear to be so are, in reality, confused and vague. Those who seek protection for society as a whole, are much less importunate than those whose selfish interests are involved; and the latter class is quite sure to be ably represented, and, too efficiently for the public good, by trained advocates. There is also an unfortunate lack of direct communication between the general and local health authorities, which delays action in cases of emergency and prevents the coöperation which is, on all accounts, desirable.

Underlying all other reasons for failure to reach the highest measure of success, is the absence of the strong influence of public opinion which controls both law and administration, and which cannot be effective till a better knowledge of sanitary matters be more generally diffused, and the people who suffer shall at last realize the interest they have in the prevention of disease. If the population of this State, as a whole, had shown a tithe of the interest, and the energetic determination to diminish the agencies injurious to human health, that our farmers have shown in procuring efficient legislation for the protection of some of the domestic animals, we should not now complain, as we do, of the unnecessary spread of many of the communicable diseases.

During the past year, there has been a very general discussion throughout the country in the various medical societies as to the nature of diphtheria, and the best means for curing or preventing it. The practical deduction from all the facts thus

far presented regarding the disease seems to be, that its cause or causes are not to be sought in any of the conditions peculiar to urban life. A recent report of the Board of Health of Boston for the year 1888 stated, that 1117 houses in which cases of this disease occurred were carefully examined; 521 houses were found to be in good sanitary condition, and 596 in defective sanitary condition. So that something more than defects in the plumbing of the house must be looked to for a sufficient explanation of the origin of the disease. The most serious epidemics relatively have occurred in this country, as in Europe, among sparsely settled districts.

At present comparative pathology seems to offer the most promising field for careful study, and it may be that some little known disease of the domestic animals is the starting point of a malady which has, during the last year, in a number of localities, proved fatal to a third part of all those attacked by it. It is useless to claim that we have gained much in our resources for the cure of this disease;—but its very evident communicability does enable us to use sanitary regulations, which would undoubtedly limit the spread of the infection, if they could be constantly applied:—these are, prompt notification of cases, isolation and disinfection. For the carrying out of all these measures we have apparently all the authority which laws of the Commonwealth can give; and yet the result is too evident to all.

No city, even, has yet provided for the use of

its health authorities the means of effectual isolation of more than one of the communicable diseases;—a few only have a system of compulsory notification in actual use, or a scheme of disinfection that has any real value.

In obedience to the will of the people, legislative bodies have made laws, but they have in very few cases created an adequate machinery for the execution of these laws;—in fact it is not easy to see how many of our statutes can be enforced by the bodies actually charged with the supervision of the public health in our smaller towns. In the majority of these the board entrusted with sanitary powers is the board of selectmen, a body representing efficiently in most affairs the capacity of the town for self-government; and that means in Massachusetts, at least, good government. But with scarcely an exception, these boards are unacquainted with the vast and somewhat indefinite powers given them by law for protecting the public health, and so, honestly conscious of their ignorance of sanitary work, they do nothing; and in their incompetence, they are perhaps wise in doing nothing. But they have unfortunately also neglected the provision of law which would amply repair their failure,—the authority given to them to appoint a competent officer of health. The prevention of disease in these communities, an interest of the public, is therefore in the hands of a body of men whose livelihood depends upon their ability to cure the disease for the prevention of which their services are rarely retained.

This apparent neglect of the towns rests, I am sure, very largely on the confidence reposed in the public spirit of the local physicians;—it is remembered that they always have done all in their power to protect their neighbors, and this, too, without the intervention of laws which seem to impair the just powers of the selectmen.

There are, however, many serious objections to this service so rendered. In the first place, it is necessarily of secondary interest to the doctor, whose time may be wholly occupied in the hand to hand struggle with death in the case of some one person who for the time being must be of more consequence to him than all others. In the next place, he may be required in the exercise of his judgment as to the influence of some manufacture or trade upon the health of the town, of the neighbors, or of the workmen, to be placed in opposition to the influential members of the small community upon whose good will his earnings may depend.

Under such conditions it is no reproach to him if he declines a service which does not belong to him, and for which he receives no compensation.

Lastly: the special field which has been opened in late years to the sanitary officer is so extensive, that the whole time of the thoroughly educated physician will be required for its cultivation. The inability of the small towns to properly pay such qualified officials might be overcome by the formation of districts, and bringing several towns under one sanitary head.

For the present, however, the service of public protection is essentially unpaid, and dependent upon the voluntary services of our profession. But if the medical men of this State are substantially agreed upon the necessity of a better provision for the protection of the public health, and are willing to use the influence that properly belongs to them, the means of protection will surely be contrived. It is a matter then of much importance that we should examine the present position of the medical profession with reference to the prevention of disease, and more especially the scientific foundations of the many claims of the sanitarian.

From the writings of Hippocrates, down through the many changes of medical opinion to the present generation, are to be gathered expressions which might be used by the most advanced investigators of the present hour in stating the conditions and prospects of preventive medicine. The Father of Medicine built firm the foundations when he declared that a proper investigation of medicine should include a study of the effects of airs, waters and places, together with a knowledge of the kind and quantity of food;—and that from these elements was to be made a diagnosis of the disease and a plan for its cure.

It is only in our own time, however, that the hygiene of the fathers has become a scientific fact, or, more correctly speaking, a collection of scientific alliances,—like a vigorous tree thrusting its roots far out into every near field that contains

appropriate food. It has questions to ask in many departments of knowledge, and insists upon finding out how the human body, under the everchanging physical and even moral relations of life, can best be protected from its multitudinous foes; for the aim of hygiene is the increase as well as the protection of health.

We are met at the very outset by the question, How much can really be done to improve the health of the community and prevent disease? It is never out of place to refer to the benefits of vaccination, and the immense influence it has had on the world. This discovery was the legitimate triumph of observation and experiment. But the condition of mental unrest, and the scepticism which our modern life appears to mistake for the scientific spirit, have led to the reöpening of the question,—with the public it should be said,—as to the value of Jenner's discovery. Some of the doubts are expressed by the writer of an article in the Encyclopædia Britannica; but the fantastic views here expressed represent nothing that we know as fact or are willing to accept as theory. He regards small-pox as "an infectious disease arising out of a common physiological or constitutional eruption on the teat of milch cows, and acquiring its special character by the persistent irritation to which it is subjected at the hands of the milker." Erysipelas, jaundice, vaccinal ulcers and vaccinal syphilis, are included by him among the natural and necessary consequences of cow-pox,—not as results of foreign contamination of

the lymph. He also believes that small-pox is destined to die out uninfluenced by vaccination.

The experience of this State is that in the year 1886 there was no death from small-pox; in the following and last registration year, there were three deaths from this disease, and this in a community constantly exposed to the introduction of the disease from abroad.

Moreover, a certain number of years of immunity from the prevalence of small-pox inevitably leads to the neglect of vaccination and consequent accumulation of susceptible persons. That the disease itself has essentially changed in its terrible severity is not evident.

In the German Empire during the year 1886, the death-rate from small-pox per (1,000,000) million living was 3.5; in cities of the Austrian Empire it was sixty-five (65) times greater; in Hungarian cities it was four hundred and eighty-six (486) times greater. Of the 155 deaths from small-pox in Germany, 45 occurred in the interior of the Empire, where the community is better protected by vaccination; and 110 in the border lands and sea coast towns, where exposure to the influences of countries not so well guarded is more direct.

A recent experience in the English city of Sheffield is also instructive. Here prevailed in 1887–8 an epidemic of small-pox, so severe that 22 persons of every 1000 living had the disease, and 2 out of every 1000 died. The sanitary condition of the population appeared to have little

influence. The death-rate among children was smaller than in any previous epidemic of small-pox, this being due to the increased prevalence of vaccination. The numerical statement of the saving of life in consequence of vaccination cannot be accurately made, but we do know that if the vaccinated children in this English city had been attacked at the same rate as the unvaccinated, they would have numbered 7000 in place of the 353 actually counted, and 3000 deaths instead of the 6 which were recorded.

It is however asserted that the protection from small-pox is secured by vaccination only at the expense of many diseases incident to the transfer of organic matter from one being to another. In Sheffield the annual vaccinations of children in the three last years have averaged 9000, and no death-certificate mentions vaccination as a cause of death.

It is undoubtedly possible that through a carelessness nothing less than criminal, one contagious disease at least may be inoculated with the vaccinal lymph into a previously healthy person. The use of animal lymph has been recommended as a protection against this danger, and by reason of many evident practical advantages.

Though statistics upon this subject in Massachusetts are wanting, it is probable that lymph from the calf is the matter generally used.

The German authorities have met the question of the possible danger of transmitting any disease from the calf to the human being by certain wise

regulations, in accordance with which competent veterinarians determine the health of the animal used, and no lymph is distributed until a post-mortem examination of the calf has shown it to be free from disease.

It has long seemed to me just that the State in making vaccination compulsory should also give its citizens the fullest assurance that they shall not be exposed to the dangers of matter infected with other diseases. While it may not be desirable to interfere with the private establishments already engaged in the business of cultivating and selling vaccine lymph,—a business which it is but fair to say appears to have been faithfully and intelligently carried on,—still there should be some oversight by competent veterinarians at least. At some of the Public Institutions arrangements could easily be made to provide at least all the material required for vaccinations undertaken at the public expense.

When it is considered that every vaccination involves the introduction of animal matter rarely in a fresh state, and possibly contaminated in many ways, into the system of the patient, the wonder is not that some one out of many thousands should suffer, but rather that thousands escape without serious inconvenience and carry with them almost absolute immunity from this hideous pestilence.

It may be remembered that in Jenner's life-time the idea arose that vaccination might be a means of controlling other diseases besides small-pox.

In answer to a communication upon this subject Jenner replied:—

"I never was so sanguine in my hopes of seeing the plague extinguished by vaccine inoculation as some of my friends were. . . . . I will just drop a hint; the vaccine disease, in my opinion, is not a prevention of the small-pox, but the small-pox itself; that is, the horrible form under which it appears in its contagious state is (as I conceive), a malignant variety. Now if it should ever be discovered that the plague is a variety of some milder disease, generated in a way that may even elude our researches, and the source should be discovered whence it sprang, this may be applied to a great and grand purpose.

"The phenomena of the cow-pox open many paths for special action, every one of which I hope may be explored."

Fifty years passed away before Pasteur and Koch took up the suggestion and began the exhaustive investigations of the protective inoculations by means of cultivations which have been so treated as to represent those milder forms of disease anticipated by Jenner. One man, alone and unaided, began this work, which best illustrates the preventive powers of medicine; he met with abuse and ridicule from many of his profession even. For his followers in this field of experiment and inquiry, costly laboratories have been provided by prudent and wise governments in some countries, by grateful fellow-citizens and admirers in another.

The laws upon the statute book have been already noticed,—some of these, and in fact the larger portion and those which more nearly touch

the comfort and safety of the individual, are executed by local health authorities. There are, however, many important questions which concern the interests of several communities, or are of such character that they cannot be properly controlled by local organizations. These questions have in this State been referred to the State Board of Health. This board has also advisory functions, and is authorized "to undertake investigations into the causes of disease and the effects of localities, employments, conditions, and circumstances, on the public health;" to investigate and advise upon the best means of assuring the purity of water-supplies, and of the disposal of refuse matters and sewage.

With the history of that organization you are familiar; its efficiency and influence will always be dependent, to a large extent, upon the favor which the medical profession may bestow upon it. The Board of Health, in its proper sphere, has always received from this Society encouragement and assistance.

So far as the investigations into the causes of diseases in the interests of preventive medicine are concerned, there are two methods of inquiry. One is of a statistical nature, and rests upon an accurate recording of all the incidents in the history of the disease under consideration,—that is to say, a registration of vital statistics. In the second place, we have the experimental methods. Of these, what may be called the popular experiments are performed for our instruction by water

boards in the case of polluted water-supplies, and by milk dealers in certain epidemics of communicable diseases,—unwittingly in both cases. Now these experiments are always unsatisfactory, from the want of a sufficient knowledge of all the attendant conditions;—nor have we satisfactory warning of the time when the experiment is to be made, and can only attempt to acquaint ourselves with causes after the effects have become evident. The other experimental method is that of the laboratory, where in the examples above taken,—a polluted water-supply and an infected milk,—the direct experiment is made upon some appropriate animal by introducing within its body a certain quantity of the suspected material and carefully noting the results.

It is always to be remembered, however, that man and the lower animals are affected oftentimes in different ways by one and the same substance or influence. The bacillus described by Eberth appears to be now generally recognized as constantly present in those suffering from typhoid fever. It has been detected in suspected water-supplies. Experiments on the lower animals have thus far failed to produce satisfactory evidence of its communicability to them. Yet we have now a mass of facts recorded showing beyond question that an organic entity has, in certain cases, found entrance to a water-supply, as in the historic epidemic of Plymouth, in Pennsylvania, where in a community of 8000 souls, 1153 were taken sick with typhoid fever and 114 died, all apparently

clearly traceable to the infection of the village water-supply by the stools of a person ill with typhoid fever; or as in a recent outbreak in Cambridge, in this State, where a quantity of milk collected from some New Hampshire farms, of more than average neatness, had been exposed in some of the processes of its preparation for market to contamination from a well dangerously near the spot in which had been deposited the dejections of a man ill with typhoid fever. This milk carried to a distant city in another State sickness and death. These experiments which have been unconsciously performed for us upon this large scale, have their counterparts probably in the experience of every physician here present.

In a State so densely populated as this it is not possible to find a water-supply sufficient for the needs of our large cities free from the dangers of fæcal pollution. We must recognize the imminent peril, and take seasonable precautions to ward it off. A thorough policing of the tributary water shed should be constantly kept up, and a systematic notification to some central authority of cases of disease liable to endanger the water supply would enable that authority to secure at the point of danger the prompt local disinfection that may be necessary. It is also well that we should remember in this connection that of the mere making of laws we have had enough perhaps; an educated sense of sanitary decency well-diffused through all classes in the community will be the most effectual agency for protecting our

cities and towns from the dangers of polluted water-supplies.

As the infective material is undoubtedly present in the discharges from the bowels in typhoid fever, the thorough destruction of the stools should be effected either by chemical action or by heat; or better still, by fire, when some mechanical appliance shall make the kitchen fire available for the purpose without nuisance.

While the evidence of the origin of typhoid fever in fæcal pollution is almost overwhelming, it must be admitted, it seems to me, that the particulate contagion of it may have a life distinct from the human body through considerable periods of time.

During the year 1888 typhoid fever was more prevalent in New England than it had been for a number of years. It broke out at nearly the same time in many widely separated districts; the cases appeared in large numbers during the months of July and August, under circumstances which made it generally impossible to trace them back to pre-existing cases. The experiences of the bacteriological laboratories indicate that the bacillus assumed to be constantly associated with typhoid fever, can be reproduced in various artificial culture media for many generations. What the hand of man can accomplish in the cultivation of these microscopic growths, nature has probably already done in some of her mysterious working places. Our knowledge of the innumerable microphytes is still so limited that we do not seem justified at

present in assuming that this bacillus under consideration is necessarily connected with man and man alone.

The question of the best way of protecting our milk-supplies from several of the communicable diseases, is not only a very pressing one but one very difficult to answer. Milk offers a soil of favorable character for the growth of many micro-organisms ; a water polluted with specific bacteria, even when used in the limited way customary in cleansing the ordinary receptacles of milk, is still capable of infecting a relatively unlimited quantity of the latter.

There is certainly no substance used so generally for food as milk, which is prepared for the market with so slight regard for scientific purity, not to mention ordinary cleanliness, as is the case with this. The cow herself is often improperly cared for, is milked so long as anything that passes for milk can be obtained ; her diseases are not properly recognized ; she is frequently in a filthy condition, while the milk itself, in the process of milking and storage, is brought into contact with the oftentimes foul skin of the animal and the unwashed hands of the milker, to be finally deposited in an unclean receptacle.

Scarlatina in the cow, the so-called Hendon-disease, which has been carefully examined in all its relations by the medical officers of the English Local Government Board, has been clearly proved to be transmissible to persons using the milk from diseased animals. Quite recently more extended

studies upon this subject by Dr. Klein have confirmed his previous statement that from the blood of persons suffering from scarlatina an organism can be separated which in microscopical and cultural characters corresponds with the strepto-coccus obtained from the sores of particular Hendon cows. This strepto-coccus Mr. Power has conclusively shown to stand in direct relations to an outbreak of milk scarlatina in certain portions of North London at the end of 1885 and beginning of 1886. Dr. Klein's recent experiments with newly-calved cows have shown that this organism, whether derived directly from the human body, or after its passage through the system of the cow, will, when inoculated subcutaneously at the root of the animal's ear, cause on the teats of the cows ulcers like those observed in the cases at Hendon. He finds these ulcers to be amongst the earliest evidences of disease in the animal; that they occur whether the animal is milked by hand or is suckling her calf. The teat-sores come in from 4 to 9 days after the inoculation; then comes a general affection of the whole skin with more or less febrile disturbance, and sometimes disease-processes are observed going on in the lungs. In the disease so induced changes are found after death in various organs, such as would naturally be looked for in an acute specific disease, and so constant in character as to make them indicative of the existence of cow-scarlatina.

He also asserts that the post-mortem appearances found in animals affected by this disease

bear much resemblance in essentials to those found in human subjects dying of scarlatina.

More recently the same department has described another disease of milch cows that had been observed at Edinburgh. The milk from the dairy, where these cows were kept, had distributed a form of febrile sore-throat among its customers. This form of sore-throat was not recognized as peculiar to either scarlatina or diphtheria. A cow suffering from this "Edinburgh disease" was placed under careful observation during life. The post-mortem appearances and the bacteria associated with them were studied; with the result, that the disease was found to be inoculable, and though having certain affinities with the "Hendon disease," still evidently was not identical with it. One of Dr. Klein's conclusions is of a scientific interest beyond the limits of the consideration of this disease. Criticism of Dr. Klein's researches has repeatedly taken shape in asserting the unity of those forms of the chain-forming micro-cocci, which he and others have been at pains to distinguish. At the end of his long investigation he finds himself in a position to enumerate seven sets of characters serving for differentiation between one and another organism of this group;—that is, that he has reached a point where the application of seven tests is wanted before an assertion of the identity of any two strepto-cocci can, even provisionally, be made. All the nine strepto-cocci examined were from the bodies of animals variously diseased. Some of the distinguishing characters

were obtained by the microscope, others by cultivation in suitable media, and all apart from evidence that is obtainable by inoculation of animals and from pathological changes resulting therefrom.

The foot and mouth disease,—a contagious eruptive fever of cloven-footed animals,—is also communicable to man in various ways, chiefly through the use of uncooked milk. It came to this country with imported stock in 1870. Children are most exposed to the disease, both on account of the relatively large quantity of milk used by them as well as from their smaller powers of resistance to disturbing influences.

Since Koch in 1882 discovered the bacillus of tuberculosis, and demonstrated the identity of tubercle in man and animals, there has arisen this most important question; under what conditions may milk become the vehicle for the transfer of the bacillus and the disease from the cow to man? At the congress for the study of tuberculosis, lately held in Paris, it was among other resolutions voted, "that the sale of milk from tuberculous cows should be absolutely prohibited." The full significance of this vote will be realized when it is added that in France tuberculosis is officially held to be one of the communicable diseases. Where there is tuberculous disease of the udder, it is of course agreed that the milk should not be used. But it is not true that tubercle not affecting the udder has been generally regarded as a sufficient reason for prohibiting the use of the

milk. Certain observers of repute claimed positive results from the intra-peritoneal injection in Guinea pigs of the milk of tuberculous cows without local disease of the udder.

The evidence from other sources is already sufficient to cause serious apprehension of danger to man from the use of milk from tuberculous animals; of course the inference is also inevitable that tuberculous mothers cannot safely suckle their own infants.

The Massachusetts Society for the Promotion of Agriculture, with a large and enlightened sense of the general importance of this question, has employed a competent physician and distinguished bacteriologist to conduct an investigation of this most important subject, and has placed at his disposal stock and suitable buildings, together with the coöperation of a skilled veterinarian. We may therefore confidently look forward to substantial additions to our knowledge of this, the most fatal disease in Massachusetts.

The number of cattle in New England suffering from tuberculosis is undoubtedly very large. From the reports of the veterinary surgeons attached to some of the large public slaughter-houses in Germany, it appears that more than ten per cent. of the cows brought to these places are tuberculous. There are no equally valuable statistics, to my knowledge, on this side of the Atlantic; but an intelligent non-medical observer, connected with one of the largest slaughter-houses in New England, believes, as the result of his own obser-

vation, that the proportion of animals so diseased and brought to our slaughter-houses probably exceeds the rate above given. It is also stated that Western cattle are not found to be tuberculous in the same relative numbers.

In the course of the legislative hearings which preceded the enactment of the present wise and quite effective statutes to prevent the sale of adulterated milk, it was held by the opponents of that legislation that the standard of pure milk sought to be established—thirteen per cent. of milk solids—was unjust, because many apparently healthy cows never yielded a milk which reached that standard of solid parts per hundred. There is but little question as to the truth of this statement. Cows of certain breeds give a very large quantity of watery milk which does not reach the legal standard, while cows of other breeds give a milk which exceeds the legal requirement. This idea, that whatever issues from the udder of the cow is authoritatively stamped as milk of unquestionable purity, lies at the foundation of many of our difficulties in securing a heathful milk.

The use of cows of certain breeds, which produce milk of low grade, is not essentially different from the unnatural feeding, which has the result of increasing quantity at the cost of quality, and amounts to the commercial fraud of watering the milk inside the cow; and does have a definite injurious effect upon bottle-fed infants, by depriving them of a portion of the nourishment which should be contained in a definitely measured

quantity of milk. The udder is, moreover, an organ of excretion as well as secretion, and the experience of the human mother is probably repeated in the animal, which is so often called upon to provide for the human infant; the milk, by reason of some quality beyond the reach of chemistry, does not agree with the stomach of the child.

The milk that reaches the consumer in the cities is, almost invariably, a mixed product. Possibly more good than harm results from this. In the majority of cases injurious qualities in any one milk would be so diluted by the addition of many times that quantity of normal milk as to give a mixture better than the single objectionable specimen. If the injurious quality, however, should be found to reside in an organic body capable of development in a suitable medium, we should have gained little by increasing its opportunities for growth. Well-considered legislative action has made it a punishable offence for a man to sell milk which falls below a certain standard. It seems to be an unnecessary concession to allow the cow to produce for the market the article which her owner is forbidden to sell as standard milk.

The importance of this subject must be my excuse for dwelling so long upon this detail of public health work. It must be plain to you that many of the dangers to which allusion has been made can only be dealt with by the authority of the State. Much of the information requisite for a

decision, in special cases of injury to health, can only be obtained through an agency which acts in all portions of the Commonwealth.

Excessive infant mortality is one of the saddest social facts of the present day. With all the improvements that have been brought about in public and personal hygiene, it is far above the rate which can be secured and does exist in other parts of the world. Our experience shows that a large part of this is the result of improper feeding. It is probably not true that female vanity has triumphed over the maternal instinct so far as to cause that marked deficiency in the capacity of the human mother which has promoted the cow to her vacant post of honor.

There is no reason given by chemistry, however, why the milk of the cow should not be all-sufficient for the human infant. Milk, very evidently, is only occasionally treated with the care which it deserves and requires. If human milk were prepared in the same slovenly fashion, and given to the infant from the same dirty apparatus, I do not believe that the results would be essentially better.

The nursing-bottle, as we ordinarily find it in use, is a culture apparatus for the micro-organisms in general, which can only be harmless from the fact of the antagonisms of the bacteria. The chemical products of decomposing animal matter also present are positively dangerous.

Dr. Böckh presented to the Sixth International Congress of Hygiene at Vienna, in 1887, some

facts in relation to infant mortality in Berlin which are very instructive. A table of deaths of infants before the end of the first year of life shows that the mortality of those fed on cow's and goat's milk was three times, and of those fed upon artificial substitutes for milk five times, that of infants nursed at the breast.

Very successful attempts by private organizations have been made, in different parts of the world, to secure satisfactory conditions of cleanliness in the preparation and distribution of milk; and these attempts would gain much in number and effect if the members of our profession would help on the movement by directing attention to the dangers attending habits on the part of the milk-producers, which have, perhaps, been thoughtlessly adopted and retained.

It is not overlooked that many other external conditions have a great influence upon the mortality of infants. I have only attempted to deal with one influence, which can, without great difficulty, be controlled.

Examinations of the public water-supplies, and consideration of the best means for securing their purity, have received much attention in this State. It has been well said that no other article universally used by man is so little examined, changed, or freed from injurious qualities, as water. No other article of food or drink is exposed to so many contaminations.

It would be a waste of time, in this presence, to insist upon the possibility of the origin of disease in infected water-supplies.

In a vague way this fact has been recognized in all ages. We learn from Thucydides that the Athenians attributed the plague at Athens, during the Peloponnesian war, to the fact that the enemy had poisoned the wells at the Piræus, the place where the disease first broke out, and whence it invaded the city. During the middle ages the connection between the use of certain drinking-waters and the outbreak of disease was so close that the suspicion almost immediately arose that some poison had been mixed with the water-supply. As the Jews were the people in the community who possessed much information as to drugs and poisons, and were sometimes wealthy, they were at once accused of poisoning the wells; and suffered somewhat as respectable members of our profession do now in trumped-up malpractice suits. In the last outbreak of cholera in southern Europe, the doctors were charged by the mob with the same offence, and in several instances nearly lost their lives in consequence of popular violence.

Dioscorides recognized the difficulty of ascertaining all the important qualities of water, and wisely says that he can make no general statement about it, so much depends on its many and varied relations to places. How permanent and how general these injurious conditions may become is shown by the prevalence of certain diseases in cities of notoriously polluted water-supplies, and by the disappearance of these diseases when this single condition is removed by the substitution of pure water.

There are many municipalities, the world over, where every new comer acquires his citizenship at the expense of an intestinal catarrh or a typhoid fever ; it is a matter of secondary importance whether this happens through a direct infection, or because disturbances are set up which open the way for the entrance of the specific poison. Typhoid fever is now more a disease of country towns than of cities, in all cases where the cities have unpolluted water-supplies. Before the general introduction of good public supplies, the reverse was true ; and still is in certain cities where the water-supply is not sufficiently protected from fecal contamination. The universal experience of mankind has taught this lesson ; some of the most permanent monuments of the old world are proofs of it.

The stranger who stands in wonder beneath the Pont du Gard to-day scarcely realizes that the great Roman, who built it to meet a sanitary need of the camp and town of Nemausus, constructed his mighty aqueduct with such costly permanence, that the flourishing modern city of Nismes shrinks from the mere burden of restoring it.

How infected the soil of a great city may become is shown by the frequent outbreak of diseases that stand in close relation to soil pollution ; and by the immediate appearance in more southern latitudes of pernicious fevers whenever the soil is disturbed during the warmer seasons of the year. The quantity of human excrement alone which is buried in the vicinity of the dwelling

houses of the older parts of our cities is enormous, even upon the smallest estimate of the amount per capita which is buried in the soil yearly.

This is sooner or later washed, in whole or in part, into the subsoil waters ; possibly to reappear upon the surface before it has lost its dangerous qualities ; and even though the quantity of impurity taken into the system at any one time be small, it must be remembered that the dose is often repeated.

The deep soil waters are themselves generally free from micro-organisms ; in whatever way we contrive to bring them to the surface something in animal or vegetable life is added to them. Absolutely pure water does not exist in or upon the surface of the earth ; nor is it at all certain that it would be better adapted to our uses if it did exist, for there has not been anywhere a continued use of chemically pure artificial waters, by a sufficiently large number of human beings, to enable us to decide the question of the influence of the organisms always present in natural surface waters.

When chemistry had reached a degree of delicacy that could discriminate between minute quantities of the dissolved substances of organic life, it was at once supposed that means had been found to enable us to form correct judgments as to the healthfulness of any given specimen of water.

The improvement of the microscope in the last generation made it possible to conveniently study the grosser microscopic organisms. The great

improvement in this instrument in quite recent years, together with Koch's method of plate culture of micro-organisms, has carried the analysis of water chemically, microscopically, and biologically to refinements which puzzle seriously our capacity to make available to sanitary science the investigations of the laboratory. Exact and repeated analyses of the drinking-waters have hitherto been rarely made ; usually they are procured under the pressure of some suspicious circumstance in the history of the water-supply, or in the hope of discovering an explanation for some unexplained outbreak of disease.

In various parts of the world examinations are now going on for the purpose of ascertaining, with all possible accuracy, all the facts in regard to public water-supplies.

Two years have been already spent upon this work in Massachusetts ; and it can now be safely asserted that, when a public water-supply again becomes so disagreeable to the senses of taste and smell that men will not drink it, the changes that have taken place can at least be pointed out.

Possibly the conditions of those changes may be still beyond control ; but we shall at least know in what quarter we are to look for help.

Observation and experiment attach a significance to the presence of certain substances in waters, which would not, at first thought, be considered deleterious. Iron, for instance, has been considered objectionable in water used for domestic purposes, simply because it left stains upon

fabrics which are washed in it, or come in contact with it. But we have now found that the presence of iron in a water makes a medium favorable to the development of certain minute forms of vegetable life which, in sufficient quantity, cause the water to become too offensive for use.

For the State examinations, specimens of the various waters selected for examination are taken every month, in such manner that the external conditions can be preserved throughout the investigation. The chemical analysis includes the determination of the color peculiar to the water, as well as the odors. In as many cases as possible the animal and vegetable forms of life are also studied. In a hundred different waters taken at random from various portions of the State it would probably be impossible to at once select those which the final judgment of the experts, with a knowledge of the chemical constituents of the water for a long period of time, would designate as dangerous on account of pollution. That is to say, the absolute figures of the amounts of ammonias, nitrates and chlorides, may vary quite considerably in different waters; and yet one would not be justified in assuming that the water containing the larger amounts of any of these substances was more unwholesome than the rest, unless an accurate knowledge of the surroundings was possessed. But these figures are of great value in the history of any one water; their variations have especial significance; and it is for this reason that the chemical determinations should be

made with the greatest accuracy possible. It cannot be granted that this great degree of accuracy is unnecessary. It is true that methods of analysis have changed much in comparatively short periods of time, and results which were deemed of great consequence twenty years ago are neglected now. It is occasionally asserted that the days for chemical analysis have passed away, to give place to bacteriological examination, to a counting of the bacteria actually present in a measured quantity of water. For a certain length of time this method has been in fashion, and it appears to be generally true that waters containing the largest numbers of bacteria are the most dangerous. These biological examinations involve the expenditure of much time and the employment of many skilled observers, if anything more than a mere counting of the bacterial colonies be attempted. It is not, therefore, probable that bacteriological examinations will take the place of chemical analysis. On the contrary, we may the rather anticipate that biological studies of the organisms contained in water will accurately determine those which may be injurious to health; and that the chemist will then devise methods for detecting the chemical peculiarities of a water which would be condemned in the laboratory of the biologist. Difficult as this requirement may be, and impracticable as it may at present seem to be, some of the results recently obtained by chemists who have made special studies in the analysis of water indicate possibilities of greater

accuracy than that to which we have thus far attained.

Specimens of surface drinking-waters may contain the ova of some of the parasites of the human body, as well as other forms of animal or vegetable life dangerous to health, but of sufficient size to be detected by the naked eye, or by the lower powers of the microscope. These organisms, however, have not attracted so much attention, or given rise to so much speculation as the bodies which are only visible under the highest powers of the microscope. Among these are to be placed those bodies which are now generally believed to be the causes of certain infectious diseases in man. The presence of these organisms cannot be detected by chemical analysis ; and it is because we have no certain knowledge as to the effect upon them of the mixture with very large bodies of water that no public health authority has ventured to advise the use of a water-supply which has once been polluted with sewage.

This hesitation also exists when we consider water in the form of ice. Examinations actually made, not only in this State but also in the laboratories of other States and countries, have shown that the process of freezing diminishes the quantity of matter in solution in the water frozen ; that this removal of substances foreign to pure water is least upon the exposed upper surface, and in the layer of snow-ice usually noticed in the article as seen in commerce; that the purification increases in the lower layers, and is greatest in that

portion of the mass which is clearest and contains the fewest air-bubbles. The change effected by freezing may thus amount to almost complete purification in part of the ice formed, and, for the whole mass, even, the reduction in dissolved matters may average ninety per cent. But it is also true that some of the micro-organisms are not destroyed by freezing. This Society is familiar with the history of an epidemic caused by the use of ice proved by chemical analysis to be impure. It should be added that, in this case, which is reported in the seventh report of the State Board of Health, the pond from which the ice was taken was wholly unfit for use as a water-supply, and probably would never have been selected for that purpose. There has always been a popular belief, for which there appears to be some foundation, that contaminated waters become purified by the act of freezing. But what we have really gained by a scientific examination of ice is this, that we now know that some portions of the mass are very much better suited to safe use than others ; and a careful preparation of the article for market will naturally include the removal of the suspicious portions.

There are also, fortunately, in every part of the country bodies of water from which pure ice can be obtained ; until these sources are exhausted we should all agree that the human body, at least, should not be used as an experimental culture medium.

Important additions to our knowledge of the

conditions that should surround the storing of water have also been made; the arrangements for protecting water from high temperatures and free exposure to light, have had marked results in diminishing the growth of objectionable organisms.

The examination of water to ascertain the presence and number of micro-organisms has also improved the construction of filters, by giving a definite test of the degree to which such bodies are removed; and we can now find filters constructed upon scientific principles and adapted to the requirements of public water-supplies even. It is also claimed that chemicals can be so added to the water to be filtered that organic substances will be removed by a reaction which frees the water from the organic bodies and produces an easily managed precipitate. There is no reason apparently why this result may not be obtained. But, granting that water may be purified by filtration, by the addition of chemicals, or by boiling, these processes are poor substitutes, on the part of the individual, for a good public water-supply which has the advantages of competent and continuous watching and of all the resources of the State for its protection.

In very close connection with any general treatment of the water-supplies of the State stands the consideration of the disposal of sewage. A few cities and towns can turn their sewage into the ocean or into streams without serious injury to any one. But the streams which can be so used

at the present time are few in number ; and, with the rapid increase of population, will soon cease to be available.

Over how wide an extent of territory the water-shed of the supply of a great city may stretch, will be understood when it is stated that the Cochituate, Sudbury, and Mystic supplies of the city of Boston, come from lakes or streams which drain a hundred and twenty-two square miles of territory, forming portions of sixteen cities and towns. In the sparsely settled parts of this area household waste may safely enough be disposed of in or on the soil ; but it is also true that in too many cases it is, in ignorance, so used as to be a danger to the household from which it comes, as well as to the neighbors.

The health of the great city requires water free from pollution ; it must have it, and, it is safe to add, it will have it.

The assertion has occasionally been made, in some public assemblies, that there is some sort of natural right belonging to those dwelling on the banks of a pure stream of water to misuse it and defile it. But this is again a question which it is quite unnecessary to discuss here, if it be true that sewage can in any way be safely treated without placing it in a body of water.

Experiments have been carried on for two seasons at a station at Lawrence, under the control of the State Board of Health and the immediate direction of men who have a complete knowledge of the conditions involved in such work. Various

methods of sewage disposal have been investigated; three only seem to deserve serious consideration:—chemical treatment; irrigation upon large areas, but not to such a degree as to imperil crops; and, lastly, intermittent irrigation upon limited surfaces of properly prepared filter grounds, without expectation of securing crops.

The first method, so far as it has yet been employed, does not remove more than half of the contained impurities, and leaves an effluent which it is not safe to discharge into a stream which is used for domestic purposes. The first cost is large, the maintenance is expensive, and the works are not always free from offensive odors.

Broad irrigation is only practicable where very large areas of cheap land can be obtained, and even in this case the probabilities of a profit from the undertaking are very small.

The method of intermittent downward filtration is that, which, thus far, offers the best hope of success. In this there is no promise held out of an income in the way of crops from the irrigation field. But the attempt is made to purify, as completely as possible, the largest quantity of sewage on the smallest area. How thoroughly these requirements have been met is manifest from a few of the many experiments made with filters of coarse mortar sand five feet in depth. Upon such a filter sewage was applied at the rate of one hundred and twenty thousand gallons over the acre daily; and after nitrification had begun the ammonias were less than one and a half per cent.

of those of the sewage. Upon increasing the amount filtered to one hundred and eighty thousand gallons for the acre, the ammonias also increased, but for the next four months averaged less than two per cent. of those in the sewage.

Another filter of the same kind, which received sewage at the rate of sixty thousand for the acre daily, gave an effluent of nearly constant quality; having one half of one per cent. of the ammonias of the sewage, and showing less organic matter than many of the drinking-waters of the State.

Still another filter of very fine sand, which filtered at the rate of twelve thousand gallons daily for the acre, gave an effluent which, by chemical analysis, contained less organic impurity than the water of Lake Winnipiseogee; at the same time the bacteria of the sewage applied amounted to five hundred and ninety-one thousand in a cubic centimetre; in the same quantity of fluid taken from the effluent there were but two, and these may have come from the air during the taking of the sample.

So far, then, as chemical and bacteriological analysis can give assurance of the possibility of effectually purifying sewage by intermittent filtration through sand or gravel, the result is satisfactory.

This, however, has been attained under conditions which probably would not be possible on a larger scale or under ordinary municipal direction. The final test, also, has not yet been made, that is, the trial to ascertain whether the peculiar

something in a given specimen of water which causes typhoid fever in the person using it will still exist in the effluent though unrecognized in the chemist's laboratory or by the microscope, and will be found to exist there by the crucial test of an experiment upon some animal susceptible of the disease. Even if complete safety has not been reached, very much has been gained by the diminution in the number of harmful agencies. There is scarcely another influence in nature of so great sanitary value, or generally so constant in its operation, as that of dilution and division.

The warfare waged by the phagocytic cells of the human body against intruding foes, so eloquently set forth in recent days, can only be successful when the enemy is divided. The strongest battalions prevail in the marvellously complicated world of the human body, as well as in the comparatively elementary arrangements of the battlefield.[1]

[1] To the same purpose is the fact that a practically thorough disinfection may be obtained in the laundry by simple washing. For the truth of this we have the experience of some of the hospital and public laundries, like that of the Sanitary Department of the city of Glasgow.

The health officer of that city, J. B. Russell, M.D., and there can be no better authority, states that during an experience of ten years there were washed in the establishment referred to over a million articles infected by every variety of known contagion. Everything was done as a careful housewife would do it, but in a place provided for the purpose and with the assistance of certain mechanical appliances. Blankets and woollen articles were not boiled; every other fabric was. The result was complete disinfection; and the test of the success of the work is found in the fact that not a case or suspicion of a case has occurred of interchanged disease,—for instance, the appearance of small-pox or other contagious disease in a house from which clothes had been taken and returned on account of scarlet fever. The only defect in the arrangement was the oc-

The undoubted protection from several infectious diseases which is afforded by free ventilation is an instance more of dilution than of destruction. What the particulate contagion may be which is carried from a person ill with scarlet fever to one susceptible of it cannot easily be imagined ; and yet, during a season of very general prevalence of this disease, almost every person in densely peopled districts must be exposed to some portion of the infectious material. The actual amount of this material which comes in contact with a susceptible subject seems to be of decided influence. It has been proved to the satisfaction of the responsible authorities in England that certain small-pox hospitals, even when most carefully managed, have been a source of infection over a large circle, of which the hospital was the centre ; with an incidence of disease diminishing regularly with increase of distance from the building this influence also stands in direct proportion to the number of sick in the hospital.

Assuming, however, that a person has been fully exposed to a contagious disease and does not contract it. Immunity from the communicable diseases, whether obtained by a previous attack of them or by the lack of that predisposition of which we hear so much now-a-days, is a simple statement of fact, behind which lies an impene-

casional infection of the washerwomen who handled the soiled clothing. But even this difficulty can be reduced to very small proportions, if not wholly removed, by more careful management and previous disinfection by heat.

trable mystery. The word "zymotic," which has been much used in this connection to designate a class of diseases, having "the property of communicating their action, and effecting analogous transformations in other bodies," unfortunately carries with it the suggestion that the phenomena of fermentation are an explanation of the diseases thus designated. It is true, probably, that the accurate study of the process of fermentation, carried on by Pasteur, contributed more than any other single investigation to the remarkable activity of the last few years in the study of the bacteria of many of the infectious diseases. But beyond the constant association in a small number of diseases of certain micro-organisms with some of the organs or tissues of the body, we have not yet penetrated. It was early seen that the micro-organism, simply as a tenant of the human body, had a comparatively limited influence. The purely mechanical invasion of the tissues of the body should not be more injurious in the case of the pathogenic organism than in that of the innocent growth. There remained, then, to be considered the products of the vital processes in these microscopic organisms. Many of these products have been shown to be possessed of the most poisonous qualities, and their study offers one of the most attractive fields for original research.

These instances of the present direction of the work of the State Board of Health have been given because they are the subject upon which the State has directly legislated. The experi-

ments and observations could not easily have been made under any other authority than that of the State, and they touch more nearly than any other general conditions the lives of great numbers of human beings by influences not easily measured or perceived even by the trained observers of our profession.

They are conditions requiring the interference of the State, because in our civilized life the individual is utterly helpless in his vain endeavor to protect himself, even could he identify the source of the injury. There must be coöperation, voluntary if it can be so arranged, but secured by all the power of the State, if need be, against stupid neglect or wicked selfishness.

Incomplete as our knowledge, then, is upon many of these subjects, it must however be evident to all that great progress has been made in the last twenty years in the discovery of many of the essential conditions of disease. We have gained enough to be able to decidedly limit some of the communicable diseases ; with others again we have accomplished but little. As in curative medicine, so also in preventive medicine, it will not do to wait until we have satisfied all the demands of science before we act. We must expect, in the light of a larger and better experience, to discard many things which we have hitherto thought to be essential, and to seek for assistance in the directions where we little expected to find it.

Our knowledge of the pathogenic micro-organ-

isms is closely limited to laboratory experiments with pure cultivations of the various species. This is very certainly not the condition of things in that outside world where diseases are contracted and the sick must be treated. There is not much really known of the simple metamorphic processes effected in plain chemical fluids by bacteria; and when it comes to the infinite variations caused by their action on the human body, we can at best only describe results.

Man exercises a power over plants that the public health officer would oftentimes be glad to possess over human beings; and something useful may perhaps be learned from the experiences of agriculture, though we may never be able to exercise the same control that the gardener so freely and profitably makes use of, when he destroys a vicious stock, or breeds out certain imperfections by the careful selection of parents through successive generations.

This art of agriculture, which has so many points of resemblance to our own, teaches us that the liability to certain diseases which is found among animals has its analogies in the vegetable kingdom.

Under certain conditions a plant is more apt to become infected by parasitic diseases; in its first tender growth, for instance, and when the surface of the plant is wounded. Peculiarities of tissues have also a marked influence; farmers know that the thin-skinned potatoes offer less resistance to the intrusion of some vegetable parasites than do

the thick-skinned varieties; but when the entrance is made there appears to be no difference in the consequent changes in either kind.

General and external conditions exercise the greatest influence upon plants, such as temperature and moisture both in the air and in the soil. Close planting is an evil that no interference short of a removal of the condition itself can relieve. Perhaps no more suggestive comparison can be made of this noxious influence, to conditions in our own social life, than that which is at once suggested by the thought of the crowded tenement houses of our cities.

It is a comparison in part only; for man suffers not alone in health, but, in his almost beastly condition of overcrowding in the worst of these tenements, is robbed of those sentiments which are worth more to the human race than robust bodies even.

As commerce has distributed over the world trees and plants, which, by some inherent peculiarity, are fitted to flourish only in exceptional surroundings; so possibly in the human race we shall find certain stocks which deteriorate when removed from their native soil, while others may improve.

In the vegetable world, a knowledge of the real nature of the disease gives us the best clue to the discovery of a remedy; removing the common barberry from the borders of the wheat field protects, to a measurable extent, the grain from a rust which has inflicted at times serious injuries on this crop.

Investigations into the geographical distribution of diseases have proved that the whole world has suffered from a pestilence which is at home only in the delta of the Ganges; while in comparative pathology we may establish the fact that some epidemic disease of the human race belongs primarily to a domestic animal, in whose body it can be most satisfactorily dealt with.

This country, but fortunately not our own State in our own time, has suffered severely, and may suffer again in this year even, from a pestilence which is endemic at one or two ports only in the Gulf of Mexico. Yellow fever is a disease which owes most of its terrors to sanitary neglect; and so long as the port of Havana is allowed to remain in its filthy condition, a permanent culture ground for the disease, so long will our whole Southern seaboard suffer from occasional panic, and what is worse still, from the state of negligent exhaustion that always follows a fit of panic.

If it were possible to control by inspection the admission of yellow fever through the regular channels of commerce, it certainly would not be possible to close the doors by which it may be smuggled in. It is a constant warning, as all epidemics fortunately are, of the need of cleanliness, and the warning has evidently not been everywhere heeded. But it is to be hoped that statesmen may find a proper subject for international consideration in the question whether any country should be allowed to maintain wantonly at our very doors an unnecessary source of harm to our lives and property.

In the comparative pathology of the communicable diseases, no disease has attracted more attention to itself than rabies. The tragic features of the final struggle, the long uncertainty as to the outbreak, and the failure of medicine to cure it, have invested it at all times with features of special interest.

The real protection afforded by the inoculations of Pasteur has been therefore gratefully acknowledged by our profession and by the people ; and is the splendid crown of a life of magnificent service to mankind. But, even in this disease, Prussia, with twenty-eight million inhabitants, by a system which deals with the dog first, and keeps the animal at all times under proper restraint, and in case of disease under care of a veterinary surgeon, has a record of fewer deaths from rabies, through a number of years, than the city of Paris alone from cases originating there.

In Paris, notoriously, whatever laws exist relative to dogs and the necessary control of them are not strictly enforced.

For our public health service, then, we must have, in the first place, a scientific knowledge of the infecting principles of the communicable diseases, in order that we may discover whence they come and how they increase and live. We must be enabled to separate the sick from the well ; each case is a public danger, of which a public officer should be notified. Each patient must be made to understand that it is his duty to protect the community as best he can. If he is ignorant,

instruct him ; if he is negligent, punish him ; and while he is helpless, support him.

The interests of the State, the city, and the individual, in questions of public health, cannot be separated. We often hear this subject spoken of as though the topics of public and private health were essentially distinct. There can be no distinction ; whatever affects injuriously the individual must of necessity produce the same changes in all others in like circumstances. The duty of the citizen is to avoid the doing of those things which may work an injury to his neighbor's health ; and this obligation the State must enforce. But the interference of the State is only desirable when there is a sufficient foundation of actual knowledge, gained either by observation or experiment, upon which can be safely established a body of laws.

These facts and the interpretation of them are properly the work of experts, who are, almost of necessity, members of the medical profession.

It is in the direction of a better preparation of members of the medical profession for this expert work that the State can render essential aid. No public interest is of so great importance as the protection of health, and there is no other public interest for which the State expends so little.

For the practitioner of medicine there is the sure prospect, if possessed of fair intelligence, good education, and industry, that he will obtain an honorable place in the world and a decent maintenance. For him who devotes himself to

the study of preventive medicine there is, at present, no prospect of employment in any place which the State or the city considers as deserving any compensation above that of a purely administrative office, which pre-supposes no unusual or expensive preparation for its proper management. This is an unpleasant contrast with the wiser management of countries where the value of human life is better recognized.

Let me not be understood to include in the positions, for which all adequate compensation is claimed, either our State or local boards of health. These boards have been made up of men, not of our profession alone, but of representatives of all the busy occupations of the world ; they have freely given their services in the past, they are doing so in even greater measure to-day, and will undoubtedly continue to do so in the future.

But unpaid service such as this should not in vain ask for the right to adequately reward the devotion and intelligence of the responsible officers, upon whom must rest the administration of some of the most serious functions of government, which can only be performed by an expert of thorough training ; and though this work were an hundred times more costly than it is, it would still be less than the useless wastes of human life and pecuniary expenditure caused by sanitary neglect.

But it has, I hope, been also made plain that the one force, upon which more than any other future reliance is to be placed, is the better education of the people in sanitary matters. In too

many directions they have hitherto been unable to speak for themselves. Everything that concerns the general health has been regarded as a mystery only to be approached by those who have had some peculiar initiation. But we have certainly now arrived at a stage in our progress where we can designate certain conditions as essential to good health, and sufficiently simple to be the property of all.

Disinfection, the essential qualities of which are now understood better than before, is seen to have no surer foundation than systematic cleanliness down to the minutest details.

The attempt to thoroughly disinfect, by means of chemical agents, any considerable space or any large object is well nigh hopeless. In many instances the attempt to purify by some bad-smelling preparation is positively dangerous, from the false sense of security conferred by the process. Let me not be understood to discourage the attempt to deal with limited quantities and individuals by means of chemical disinfectants; but in proportion as we try to deal with indefinite things does our work cease to have a definite value.

Thorough washing with soap and water has been shown by experience in the laundries of pest-houses to be fully as efficacious as the most elaborate treatment with chemical disinfectants. For such objects as cannot be washed, heat above two hundred and twelve degrees, exposure to sun and air, beating in open places, have effected the same result. The thorough cleansing of the walls and

exposed surfaces of infected rooms, with a generous supply of fresh air, has apparently answered as well as the most elaborate diffusion of disinfecting gases.

In dealing with the patient, however, there is some excretion from the body or some definite particle which bears the infection, and can be destroyed and must be destroyed if possible. This destruction may be accomplished by chemicals, or by heat, or better still by fire. It is true in this as it is in the practice of ventilation for the removal of foul odors, that it is much easier to conduct away the stench before a large room is polluted by it, than to change all the air in the apartment itself.

Mr. John Simon, many years ago, suggested that the troublesome question of a separate isolation ward in a hospital would be answered if sufficient separate ventilation outwards could be obtained for the bed of each patient, by bringing it into connection with an outward ventilating shaft. In one hospital at least this has been accomplished by making a direct connection between the interior of the bed and the ventilating system of the building; the apparatus is quite simple, as all practicable systems of ventilation should be, and has at least answered the purpose of removing one disagreeable odor without introducing another.

While indicating a few of the directions in which public health authorities have undertaken to provide relief for existing sanitary defects, or

to obviate the injurious influences inseparable from the growth of population, I am conscious that many things have been omitted which are substantial gains to our power of dealing with disease, both from the side of the physician as individual, and from the point of view of the public health authority. But enough have been enumerated to prove that there can be no separation of interests. The individual will surely not needlessly suffer when the community as a whole is so far protected as mortal hand can protect. But there will be the unending struggle, for all that, in which our profession can bring relief to the suffering, hope to the hopeless, and strength to the weak.

During many years it was the pious and gracious custom for the reader of your annual address to briefly commemorate the services of the members of this Society who had died during the year.

The Massachusetts Medical Society now numbers nearly eighteen hundred members. Thirty-nine who were with us a year ago will meet here no more. It is not possible in the few minutes at my disposal to name each one of them.

They lived active, devoted and unselfish lives; not many of them were known in the great world, and very few of them had acquired more than a modest competence; but among them were those who had fairly earned the title of "the good physician" by qualities which are recognized and

honored now as they always have been since the time when their possession deified the Father of Medicine.

Some had been more especially known to us and the public for the attention which they had bestowed upon measures for the improvement of the public health ; but no one of them had hesitated to contribute what he could for the protection of all, well knowing that herein lay the best security for the well-being of each part.

The figures of their ages are the measure of their sacrifices ; length of days is more rarely given to him who practises our profession than to any other of the so-called learned occupations of men. But what reward had they, and what shall be ours ? Let our own poet speak :—

> "In life's uneven road
> Our willing hands have eased our brothers' load ;
> Pain was our teacher, speaking to the heart,
> Mother of pity, nurse of pitying art ;
> Our lesson learned, we reached the peaceful shore
> Where the pale sufferer asks our aid no more,—
> These gracious words our welcome, our reward,
> Ye served your brothers ; ye have served your Lord."

ARTICLE XVII.

MODERN METHODS IN TEACHING CLINICAL OBSTETRICS.

By EDWARD REYNOLDS, M.D.

OF BOSTON.

READ JUNE 12, 1889.

MODERN METHODS IN TEACHING CLINICAL OBSTETRICS.

In consideration of the great advances which have been made during the last few years, in the methods of instruction in clinical obstetrics in Harvard University, it has been thought that a brief account of the system now in use might be of interest to the general profession, especially in view of the marked decrease in the death-rate which has followed its adoption, as evidenced by the results of the work done by the students during a calendar year.

The material at our disposal is that furnished by the out-patient department of the Boston Lying-in Hospital and the obstetric department of the Boston Dispensary, and the increase in these clinics during the last few years has been so great that, in spite of the increased size of the class, we are able to-day to supply to each student an amount of clinical material which was unthought of a few years ago.

It may be mentioned in passing that the clinic has grown from about 250 cases in 1886 to more than 500 in 1888, and almost 300 in the six months of 1889 which have already elapsed, all of which cases are confined under the observation of the students, who have also the privilege of assisting at the many and often difficult operative deliveries which constantly occur. Remembering that our classes rarely exceed a total of 75 men, it will be observed that they attend upon an average about 7 cases a-piece,—one especially enthusiastic man in this year's class having delivered 22 women during the year. In addition to this, a recent enlargement of the department has enabled us to give detailed clinical

instruction to each student; and it is to this more careful superintendence of their work and to its more thorough systematization that we attribute the improvement in our results.

The mechanism by which the clinic is managed is as follows: the hospital has fitted up two rooms for the use of its out-patient department, one in the hospital building, and one at the South End of the city, and has kindly allowed the patients of the dispensary to be attended from these rooms on an equal footing with those under its own charge. Two students are constantly in residence at each of these rooms, and more are supplied if a press of cases makes it necessary.

These opportunities are so arranged that each student receives during his third year an appointment as externe to the hospital, the terms of service being so altered from time to time as to secure a substantial equality in the number of cases attended.

When a pregnant woman applies either to the hospital or to the dispensary for care during her confinement, as an out-patient, her name, address, and expected date of confinement are forwarded to Dr. C. M. Green, the Instructor in Obstetrics at the School, and she is assigned by him to the out-patient room nearest her residence. She is at once visited by the senior student then on duty, who takes her history, re-ascertains the probable date of confinement, directs her to send for him as soon as labor appears or sooner if any complication of pregnancy arises, and files her card in its place among the applications at the room. In most cases she is not seen again until she sends in labor. She is then at once visited by the senior student on duty at the time, who explains the absence of the man she had previously seen, and assumes the charge of the case.

Each student is required by the school to return to Dr. Green a full and carefully written report of at least 4 cases

which he has personally attended during labor and convalescence, and it is further required that he should have received personal instruction at the bedside of at least one of these cases from one of the Assistants in Obstetrics, namely, Dr. C. W. Townsend or the writer.

This clinical instruction is given whenever possible on the first case attended by the student, and is intended to include both the abdominal and vaginal examinations, at a time when labor is sufficiently advanced to allow a satisfactory diagnosis of position to be made from either. Whenever it is possible, the care of the perineum and the expression of the placenta are also demonstrated. To this is added a few words of clinical teaching illustrating any points of special interest in the individual case, and finally, the student is required to repeat the examination and is cross-questioned about it, in order to make sure that he understands the instruction which he has received. He is required to present his request for instruction upon a printed blank, which he is expected to fill out in full so far as the stage of labor permits, and he is always aware that the blanks are to be saved and their excellencies or faults commented upon before the class; his name of course being suppressed.

Though instances occur in which the student's diagnosis is found to be incorrect, they are surprisingly rare when we remember the inexperience of the men, and we are constantly surprised to see the care and intelligence which is manifested in the filling out of these blank requests.

The accuracy of their results from abdominal palpation is particularly gratifying, and we regard it as one of the most important advances which have been made in our teaching, that our students enter upon practice with so thorough an equipment in a method of diagnosis which has until lately been completly neglected by the profession at large. We find that the students are in general inclined to place nearly

as much reliance upon the abdominal as upon the vaginal examination, an impression which is I think shared by most men who have given the subject special attention, but which was hardly to have been expected *à priori* from inexperienced men. It is however in palpation especially that the gain which follows personal instruction is most plainly to be seen.

A student who has once had abdominal palpation demonstrated to him is much more likely to make a reliable diagnosis in this way in his later cases, than one who by some accident does not receive this instruction till toward the end of his series.

He is taught to examine the abdomen after the following manner: the physician should stand at the bed-side of the patient facing towards her feet as she lies upon her back. The hands are placed upon the abdomen, one on each side of the fundus, and pressed gently inward till the resistance of the uterine wall is felt. In a very fat or rigid abdomen, it may be impossible to perceive anything more than that a sense of greater resistance is found upon that side to which the solid back of the child is directed, but in most cases gentle movements of the hand up and down while pressed against the uterus in this way will detect the inequalities due to the fœtal small parts upon one or the other side. The finger tips of each hand are next pressed deeply into the inguinal regions in search of the fœtal head as it rests upon the superior strait, care being taken to make the motion by which this is done gradual, and devoid of sharp or jerky movement. With a well flexed head the greatest resistance should be found on the side to which the face is directed, and should therefore correspond to the side on which the fœtal limbs were found. Any lack of such correspondence should awaken suspicion as to the correctness of one or the other observation, or if both are verified would suggest the presentation of a brow or extended head.

If the resistance of the head is not felt in the inguinal region, the upper extremity of the fœtus should be carefully examined in order to exclude the possibility of a breech presentation, in which case the head is of course at the fundus and may be distinguished either by its separation from the trunk of the fœtus by a sulcus which corresponds to the site of the neck, or by the fact that the head is more mobile upon the trunk than the breech.

The site of the fœtal heart as found by auscultation furnishes a further guide in diagnosis, its greatest intensity being always heard over the fœtal back, with the single exception of face presentations. The abdominal examination having been completed and a diagnosis made, the next duty is to confirm or revise that diagnosis by comparing it with the results of a vaginal examination. But before this is made the students are required to disinfect the hands after the following method: the hands are thoroughly washed with soap and water, carefully scrubbed with a nail brush in a solution of corrosive sublimate of a strength of 1 to 3500, and then anointed with eucalyptus vaseline, *i. e.*, a mixture of eucalyptus oil and vaseline in the proportion of a drachm to an ounce.

Then as the finger enters the vagina, the student is required to notice successively the width of the vulva and vagina, the condition of the rectum, and position of the coccyx, before determining the character and degree of dilatation of the os. This having been determined, he is to make his diagnosis of position from the fontanelles and sutures, remembering that the small fontanelle is to be recognized as the meeting place of three sutures, and that the position of the head is to be determined less by the position of that fontanelle in the pelvis than by following as many sutures as possible to their terminations, one of them ending in the great fontanelle, while each of the others is lost in the vicinity of an ear.

If both fontanelles are found, the position of the head is determined by the direction of the sagittal suture which connects them, while if only the ears are found a careful determination of the direction in which their flaps point, enables us to ascertain the direction in which the occiput must lie.

The height of the head in the pelvis is another point which should always be ascertained, and is found by passing the finger to that point at which the head is found to be in immediate contact with the pelvic wall, which point is necessarily situated at or about the greatest diameter of the fœtal head. The pulp of the finger is then turned towards the pelvic wall, in order to determine at what part of that wall this diameter of the head is found.

The student is expected to have at least made the attempt to ascertain all these points before the arrival of his instructor, who then repeats the examination, demonstrates to him any defects in his observations, and encourages him to repeat them till he is certain of the facts.

His armament for the work consists of a bottle of corrosive sublimate in tablets, a box of eucalyptus vaseline, a nail brush, a Davidson's syringe, a long English webbing male catheter, and a stethoscope; to which are added bottles containing laudanum, fluid extract of ergot and a solution of chloral, together with any minor conveniences which he may think necessary. If an abundant or foul vaginal discharge is present, the vagina is thoroughly douched with the sublimate solution at the beginning of labor, but in clean cases no douche is given till after the delivery of the placenta, although every case receives a douche at that time. Under ordinary circumstances, that is if no suspicious symptoms appear, nothing more is attempted except a daily washing of the external genitals and the use of as clean napkins as are obtainable.

No difference is made as to antiseptic precautions between

operative and normal cases, except that after version, manual removal of a placenta, or any intrauterine operation, if from hurry or other cause there is any doubt about the thoroughness of the antisepsis used, an intrauterine injection of 1 to 4000 corrosive sublimate solution, followed by a few ounces of a weak carbolic solution, is sometimes used. This is however rare. This attempt at surgical cleanliness of everything which approaches the vulva, and the use of one, or at most two vaginal douches during labor, is all that is done in the way of antisepsis, since it is impossible for us to attempt any such complete antisepsis during convalescence, as is done within the wards of the hospital; but this simple and somewhat rough system has reduced the mortality from sepsis in our clinic, from a very high one in former years to .002 in 1887, and nothing in 1888.

The interest of the relation of our antiseptic system to our results seems to me so great, however, that a more complete consideration of its effect upon the results had perhaps best be deferred to the report of cases which is to follow.

The 447 cases confined in 1887 included a somewhat unusually large proportion of interesting deliveries, but as most of these have already been reported in detail, I have thought it best to restrict myself here to a merely statistical report of the year's work.

Of the 447 women, 446 were discharged well. One died, a case which will be spoken of later. 451 children were delivered, there being 4 cases of twins.

Of these, 7 were non-viable, *i. e.*, were born after less than 7 months gestation; 4 were born macerated; 12 or 2.6% were stillborn, unmacerated; 10 or 2.2% were born alive but died before discharge, while 418 or 95.2%[1] were discharged alive.

[1] Of those born viable and unmacerated. The probable cause of death, or of stillbirth, in each case, is shown in the table.

Table I.—Still-births.

Still-born, 12.

Craniotomy	2
Prolapsed Funis	2
Placenta Prævia	2
Premature	1
Hydrocephalus	1
Delay in extracting head after version (universally contracted, flat pelvis) . . .	1
Delay in extracting head after a breech presentation	1
Delay in extracting body	1
Unknown	1
Total,	12

Table II.—Fœtal Deaths.

Deaths, 10.

Accident, 3d day . .	Healthy children.	1
Exposure to cold by family .		1
Unknown (foul play?) .		1
Premature (after 14 hours, 12 hours, and 45 minutes respectively)		3
Congenital Syphilis		1
Hæmatophilia		1
Icterus Neonatorum (marasmus) . . .		1
Asthenia		1
	Total,	10

The average length of labor was computed and gives about the usual result.

		Premature.	At term.	Length of labor at term reported in.	Average duration of labor.
Multiparæ,	326	13	313	288	11 hours, 8 min.
Primiparæ,	103	4	99	90	20 hours, 8 min.
		Total,	412	378	13 hours, 45 min.
Unknown,	18				
Total,	447				

The reported weights of the children shows, as usual, that the children of multiparæ were slightly heavier than those of primiparæ.

TABLE IV.—WEIGHT OF CHILDREN.

	Weight reported in.	Average weight.
Children of Multiparæ,	305	7 lb. 9℥.
" " Primiparæ,	96	7 lb. 6℥.

TABLE V.—SEX OF CHILDREN.

Males . . .	204
Females . . .	211
Unreported . .	36
Total,	451

The nationality of the mothers is shown by

TABLE VI.

Birth place.		Birth place.	
Ireland,	101	Sweden and Norway,	10
United States,	94	Italy and Portugal,	10
Poland,	57	Total,	401
Russia,	50	Scattering and unknown,	46
Germany and Austria,	37	Total,	447
Canada,	27		
England,	15		

The Poles, Russians, Germans and Austrians, almost without exception Jews, present few if any marks of distinction, and may perhaps fairly be classed together, num-

bering in all 140 cases, or 35% of the total number. The Irish make up about 25% of the whole; the natives of the United States and Canada about 30%; and it is hoped that in future years, and with a larger number of cases, an inquiry into the characteristics of labor and the frequency of contracted pelvis in the different nationalities may become possible.

TABLE VII.

Labor was Natural in	412[1]
Operative in	35

The nature of the 35 operative cases is shown by—

TABLE VIII.

Extraction of Breech	8
Low Forceps	13
High Forceps	4
[2]Version	8
[3]Craniotomy	2

TABLE IX.—EXTRACTION OF BREECH.

Footling.	Weight, lbs. oz.	Premature.	Pelvis.	Operator.[4]	Child.	Remarks.
....	....	....	Normal.	H.	Well.	No progress for 3 hours.
Yes.	9–12	....	"	H.	Still.	Failing fœtal heart. Delay with head.
....	8–12	....	"	S.	Well.	Extraction of extended arms.
....	8–0	....	"	H.	"	Inertia Uteri.
Yes.	5–3	....	"	R.	"	Foot at vulva, breech in iliac fossa (oblique presentation), no progress.
....	8–8	....	"	R.	"	Inertia Uteri.
Yes.	3–0	7 ms.	"	R.	Still.	Macerated fœtus, rigid os.
....	3–0	7 ms.	"	R.	"	Macerated fœtus, rigid os.

[1] Including natural deliveries of the breech in 6 cases, of which 4 were premature.
[2] Two preceded by an unsuccessful application of high forceps.
[3] One preceded by an unsuccessful application of high forceps, and one preceded by an unsuccessful application of high forceps, followed by version, with perforation of the after-coming head.
[4] H.=House-physician, B. L. H. S.=Student. R.=Reynolds.

SUMMARY.

Children	At term	6
	Premature	2
	Stillborn, macerated	2
	" unmacerated	1
	Discharged well	5
Mothers	" "	8

TABLE X.—LOW FORCEPS.

Nationality.	Duration of labor. h. m.	Position.	Weight of Child. lbs. oz.	Operator.[1]	Number of pregnancy.	Remarks.
Polish.	~~	O. D. P.	7-8	R.	1	Manual flexation of extended head. Forceps applied obliquely. Head rotated within them.
Irish.	84-40	"	9-4	T.	1	Prolonged 1st stage. Mother died on 6th day. Head rotated by pains, but delayed by rigid perinæum.
Russian.	25-00	O. L. A.	6-12	R.	1	Eclampsia, one mild convulsion. Extreme œdema of vulva. No urine for 4 hours before delivery, then by catheter dr. j., which contained abundant casts and 1% albumen. Good and rapid convalescence, without convulsions, under warm pack and pot. acet.
German.	17-40	"	10-0	R.	1	Long 2d stage. Fœtal heart 170. Maternal pulse rapid and rising.
"	36-00	"	6-0	T.	1	Inertia uteri.
"	16-00	"	8-8	R.	5	" "
U. S.	11-00	O. D. P.	8-0	T.	1	Head already rotated, but delayed by perinæum.
German.	27-00	O. L. A.	7-0	R.	1	Rigid perinæum.
U. S.	140-00	"	6-0	R.	1	Absolute inertia for 2 hours. Head on perinæum at 8 mos.
"	20-00	"	5-0	R.	2	Long 1st stage at 7 mos. Head low, os two-thirds dilated. Rapid rise of pulse and temperature.
Irish.	54-35	"	8-4	R.	1	Rigid perinæum.
Russian.	20-10	"	9-0	H.	1	" "
U. S.	37-30	"	6-0	H.	1	" "

[1] R.=Reynolds. T.=Townsend. H.=House physician, B. L. H.

SUMMARY.

Primiparæ,	11
Multiparæ,	2
Total,	13

Mothers	Discharged well	12
	Died	1
	Total,	13
Children discharged well		13

Indications.

Extended head	1	
Eclampsia	1	
Rigid soft parts	8	Pelves all normal.
Inertia	3	
Total,	13	

TABLE XI.—HIGH FORCEPS.

Nationality.	Duration of labor. h. m.	Position.	Weight of Child.	Operator.[1]	Number of pregnancy.	Pelvis.	Child.	Remarks.
Irish.	8-15	O. D. P.	5-0	R.	1	Normal.	Well.	Low attachment of placenta. Labor at 8 mos. Rather severe hæmorrhage. Head high. Os two-thirds dilated.
Polish.	29-55	O. D. P.	6-12	T.	1	Justo-minor. Spines 9¼ in. Crests 10¼ in. Ext. conj. 7¼ in. Diag. " 4¼ in. Symph. 1 in. True conj. 3¾ in.	Well.	Rising pulse and temperature. Head engaged. No progress for 3 hours.
English	12-05	Brow O. L. A.	8-6	G.	2	Normal.	Well.	Fibroid in lower uterine segment, and tight constriction ring about neck. Manual flexation and version were tried but abandoned as impossible. Manual extension to a face (M. D. A.) was then done, and forceps were then applied successfully.
Irish.	9-00	O. L. A.	9-0	R.	3	"	Still.	On arrival—head engaged, funis prolapsed and pulseless, fœtal heart beating. Child extracted rapidly, but was still.

[1] R.=Reynolds. T.=Townsend. G.=Green.

SUMMARY.

Indications.

Low attachment of placenta	1	Mothers discharged well	4
Justo-minor pelvis	1		
Brow-presentation	1	Children " "	3
Prolapsed funis	1	Children still-born	1
Total,	4	Total,	4

TABLE XII.—VERSION.

Nation-ality.	Duration of labor. h. m.	Presen-tation and Position.	Weight of Child.	Operator.[1]	Number of pregnancy.	Pelvis.	Child.	Forceps.	Remarks.
Norwegian.	42-45	Head O. D. P.	6-12	G.	4	....	Well.	....	Delay.
U. States.	......	......	4-13	R.	3	Normal.	Born alive, but died after 14 hours (premature).	....	Antepartum peritonitis at 7 months. Labor appeared spontaneously, but did not progress, and patient beginning to fail, the os was manually dilated, and child extracted.
Canadian.	3-10	Head O. D. P.	7-8	R.	2	"	Still.	....	Placenta prævia partialis. On arrival—child dead, severe hæmorrhage going on. Manual dilatation and slow extraction.
Irish.	10-15	Transverse Sc. L. P.	7-0	T.	4	"	"	....	Presentation of hand and cord. On arrival—child dead. Waters escaped. Marked retraction of uterus.
"	14-25	Transverse Sc. L. P. Breech S. D. A.	7-0 7-0	R.	7	"	Well. "	....	Twins.—1st twin, transverse, waters gone. Cephalic version impossible, podalic easily accomplished. 2d twin, breech, immediate extraction.
Russian.	9-00	Head O. L. A.	10-0	R.	4	Simple flat Diag. conj. 4¼ in. Symph. long, 4¼ in. True conj. 3¼ in.	"	Axis-traction failed.	Version rendered difficult by constriction ring. Extraction of head very difficult. Head movable above brow at time of operation.
Irish.	19-00	Head O. D. A.	8-0	R.	4	Universally contracted, flat. Spines 9¾ in. Crests 11 in. Ext. conj. 8 in. Diag. conj. 4¼ in. Symph. low and erect. True conj. 3¾ in.	Still.	Axis-traction failed.	Slight constriction ring about neck. Head movable. Version difficult. Extraction very difficult. Delay with head. External measurements increased by great fatness of patient. Three previous normal labors, with living children.
U. States.	0-45	Head	5-4	R.	7	Normal.	"	....	Placenta prævia centralis. At 7 months profuse hæmorrhage without pains. On arrival—patient (colored) collapsed and still flowing. Os undilated. Manual dilatation (40 min.), version and extraction (5 min.).

SUMMARY.—Indications: Contracted Pelves, 2; Placenta Prævia, 2; Transverse Presentation, 2; Ante-partum Peritonitis, 1; Delay, 1. Total, 8. Mothers discharged well, 4. Children: discharged well, 3; stillborn (3 dead before operation), 4; died (premature), 1.

[1] G.=Green. R.=Reynolds. T.=Townsend.

TABLE XIII.—CRANIOTOMY.

Nationality.	Duration of labor. h. m.	Position.	Weight of Child.	Number of pregnancy.	Pelvis.	Forceps.	Version.	Operator.[1]	Remarks.
German.	20–00	O. D. A.	6–8	3	Universally contracted, flat. Spines 9½ in. Crests 10½ in. Ext. conj. 7 in. Diag. conj. 4 in. True conj. 3¼ in.	Axis traction failed.		R.	After failure of forceps Prof. Richardson was called in consultation, and did version on the chance of saving the child, but failed to extract the head, which was then perforated.
							Performed.	R'n.	
						Craniotomy &c. after-coming head.		R.	
Russian.	54–45	O. D. A.	8–0	1	Justo-minor. Spines 9 in. Crests 10¾ in. Ext. conj. 6¾ in. Diag. conj. 4 in. Symph. 2 in. True conj. 3 in.	Axis traction (Brens) failed.		R.	Not seen till late in labor. Dr. Green called in consultation. Cæsarian section considered, but ruled out by exhaustion of uterus. Head free above brim. Forceps applied as routine measure. Extraction of perforated head occupied 2 hours. Extraction of body very difficult. Rapid recovery. (April, 1888, delivered of living child at 8 months by induction of labor and high forceps.)

[1] R.=Reynolds. R'n=Richardson.

SUMMARY.

Indications.

Universally contracted flat pelves 2
Mothers, discharged well 2

The especial interest of these cases lies, to me, in the low death-rate from all causes and the infrequency of septicæmia, when these are considered in connection with the conditions under which the women are confined, and with the degree of antiseptic precaution observed.

With one exception, all the conditions which were formerly thought to be conducive to the propagation of puerperal fever are present in a marked degree. The women are *not* congregated together in a Lying-in Hospital, but they are almost without exception filthy, ill nourished, and over worked. They are confined in rooms, the filth, squalor and utterly unsanitary condition of which often beggars description, and are attended for the most part by entirely inexperienced men; yet the proportion of even mild sepsis has been kept below one per cent., and the maternal death-rate from all causes has been below one fourth of one per cent., while the fœtal death-rate was less than five per cent.; and this in connection with the fact that in former years, in the same clinic and under the same circumstances, the death-rate from septicæmia was extremely high.

We who are observing the clinic from day to day, can only say that in our opinion the antiseptic system employed, imperfect though it may be, is the only change in the conditions, and that it must be held responsible for the improvement which we see.

It is manifestly impossible under the conditions of our clinic to carry out in full the system of antiseptic irrigation and vulva pads advocated by Garrigues and Richardson, and now so generally adopted, at least by institutions and by those especially interested in obstetrics, but we have taken advantage of one of the principles laid down by these authorities, *i. e.*, that if the labor is antiseptically conducted and the passages are made thoroughly aseptic at the end of labor, the natural valve-like action of the vulva and the constant outflow of the lochia tend to ward off and drain

away the contagium, unless it be afterward artificially introduced by a meddlesome finger or instrument. Prof. Richardson further suggests that the common and indeed necessary habit of these women in rising to pass urine and fæces undoubtedly tends, in spite of its other disadvantages, to promote a frequent and thorough drainage of the vagina.

The value of even so imperfect a system is, I think, well shown by the results of any one of the last three years' work. The statistics of 1887 have been selected because they were already at hand, and not because that year was in any sense the best.[1]

During that year we had four cases of septicæmia; but before proceeding to describe them, it may be proper to first define the sense in which this word "septicæmia" is used here; which is, that though every rise of temperature should clinically be considered sepsis until another sufficient cause is found for it, yet only those cases are reported as such in which the temperature was above 100° for several consecutive days, and in which a collection of one more such symptoms as marked uterine tenderness, delayed involution, scanty secretion of milk, foul lochia, or the so-called diphtheritic patches in the vagina, appeared synchronously with the temperature.

Under this definition we had but four cases of septicæmia during 1887, and in connection with a report of these cases it seems proper to speak briefly of our routine treatment of that condition.

When the report of a high temperature is brought to us, the patient is visited by the assistant on duty at the time, and if after the lapse of 24 to 48 hours the temperature is still high and no cause other than sepsis is discernible, a speculum examination is made, any diphtheritic patch that is found is dusted with iodoform, or if there is much uterine

[1] In 1888 there was no maternal death from any cause, and we have recently confined more than 800 cases consecutively, without a death.

tenderness or a foul cervical discharge, an intrauterine douche of a 1 to 1000 corrosive, followed by a few ounces of a 1 to 100 carbolic solution, is given, and an iodoform bougie is passed to the fundus; the remainder of the treatment consisting simply in the free use of alcoholic stimulants and of forced feeding so far as that is possible.

During 1887 the gray patches were found but three times and no intrauterine douche was given. The majority of cases in which sepsis is suspected always proving to be merely instances of vaginal decomposition of the lochia without infection of the endometrium, with very mild and often no constitutional symptoms, and promptly relieved by bi-daily vaginal douches of the bi-chloride. Such cases are not here included under the name of septicæmia.

In the first case to be reported the patient had a chill upon the fifth day, and for ten days thereafter had a variable temperature, which was never above 101° and from that fell gradually to normal. There were no gray patches, and no very marked uterine tenderness; the lochia were foul and scanty, and the milk diminished. The disease was of mild type, the prognosis was never thought to be serious, and both mother and child were discharged well at the end of three weeks. It was found that the student in charge had without authority directed an untrained person to give a bi-daily vaginal douche of 1 to 3000 corrosive, and that this had been done with an old and foul enema syringe.

In a second case I was myself present accidentally at the delivery, and superintended a most stringent use of the usual precautions by the attendant, only to find, at the conclusion of the labor, that an old woman who was present had substituted a basin of Cochituate water for the corrosive sublimate solution, at a moment when our backs were turned. The woman was dirty, the lying-in room was a close and foul-smelling tenement, and a rather severe septic cellulitis, with gray patches in the vagina, foul lochia, suppressed

milk, great prostration, and continued high temperature, was the result. The patient though very sick eventually recovered.

The third case was one in which an irregularly high temperature for five days, with slightly sour lochia, abundant milk, doubtful gray patches in the vagina, and marked inflammatory reaction about an old cellulitis, followed by good recovery, occurred in a case which had been managed by a widwife for some hours before it came into our hands.

The remaining case is put down as septicæmia for the sake of fairness, although no diagnosis was ever made. The woman was an elderly primipara, who after a lingering first stage of four days' duration was delivered by Dr. Townsend by low forceps under full antiseptic precautions. Her temperature was high from the time of delivery, and on the fourth day rose sharply to 105°, in coincidence with the appearance of a general erythema. Lochia sweet though scanty, milk scanty, no gray patches, no marked abdominal tenderness. Dr. Townsend was unable to make a diagnosis, but suspected an attack of one of the acute infectious erythemata; the patient then left the clinic, and died the next (the 6th) day under the charge of a regular practitioner who expresses himself as unable to make a diagnosis, or to exclude sepsis. It is included in our list as the only death from any cause, although technically discharged alive.

The lesson which these and other cases have taught us, and which I hope may be of interest to others, is that that field of practice to which it has been thought that the application of antiseptic methods was least practicable, namely, the poor practice of partially trained men working among unsanitary surroundings, is precisely the field in which, from the prevalence of septicæmia, the greatest saving of life and health is to be expected, and certainly I can but feel that if any man who has thought that the circumstances of his practice made it impossible for him to observe antisepsis will but try to take at

least as much care as our students do, he will agree with us that the feeling that he can go into any hovel admidst the congregated filth of a family of peasants, and in the stifling heat of a city tenement house in August, and do the most serious obstetrical operations with an almost complete certainty that his care has excluded the ever-prevalent risks of septicæmia from the list of dangers through which the patient must pass; and furthermore when he can go away from such a case believing that the patient having recovered well from her ether has nothing more to do than to gather her strength together for her convalescence, then he will agree with us that the attendant lightening of his anxieties is worth ten times the trifling trouble which his antisepsis has cost him.

Nor can any better answer be desired for the objections of those few men who still believe in the importance of meteorological, constitutional or other autogenetic conditions in the causation of childbed fever, than the fact that we have now confined more than 1000 consecutive cases under the care of students, in the vilest hovels of the city, surrounded by filth of every description, and with the insufficient nourishment and discomforts under which this class of a city population sustains life, and this at all seasons and during the varied climatic conditions of a two years' period; and that under all these disadvantages, mere attention to the surgical cleanliness of the patient's genitals and the attendant's fingers has apparently been the chief factor in reducing the mortality from all causes to less than 0.1%.

ARTICLE XVIII.

ESCHAROTICS IN THE TREATMENT OF MALIGNANT DISEASE.

BY JOHN C. MUNRO, M.D.

OF BOSTON.

READ JUNE 12, 1889.

ESCHAROTICS IN THE TREATMENT OF MALIGNANT DISEASE.

In reviewing the history of escharotics in the treatment of cancer, one meets on the one hand with assertion, honesty and implicit faith; on the other, with denial, dishonesty and bigotry. Each particular drug has a champion ready to defend it by fair means or by foul, and to give a just verdict to the claims of each champion is by no means an easy task.

One main fact, however, must be maintained here from the very beginning; escharotics are not best and safest for the treatment of cancer in even a fair proportion of cases. The knife or the sharp spoon stands preëminently *the* method of treatment, and it will stand so until some specific is finally discovered; but there are a small number of cases where the use of the knife is impracticable or impossible, or where a fear of its use makes it impracticable; in these, caustics, if any treatment is possible, can and ought to be used.

With regard to immunity from recurrence after removal by caustics there are no data in all history that warrant one to conclude in favor of caustics over the knife; without question the chances are just as good and just as bad in either case, *cæteris paribus*.

The best observers are furthermore agreed that where the treatment is undertaken it must be steadily and vigorously pushed; not done in a half-hearted manner; and by observing proper precautions there should be no especial danger.

Individual cases and statistics will be avoided in what follows; a great many have been carefully analyzed, but they are of such a nature that their value in deciding, absolutely, any question, is almost *nil*, and it has seemed best to give only general conclusions. The various important caustics will be considered in order, and then an outline of the history of their uses, together with that of the most famous men (both honest and dishonest) connected with them.

Next to the actual cautery which is painful, limited in its action, often more dreaded than the knife, and useful only in a small proportion of cases, the strongest escharotics are the mineral acids. Of these nitric acid is most generally used. It is energetic but difficult to manage, so that ordinarily its employment is limited to the destruction of the epidermis over tumors for the subsequent action of other escharotics, or to the application in small superficial malignant growths. Rubbed up with charpie to a gelatinous mass it is more under the control of the surgeon.

Sulphuric acid mixed with some substance like saffron, lampblack, asbestos or sulphate of zinc, was considerably used at one time; it makes a dry, black crust that is rapidly cast off, but it seems to be inferior to the alkaline caustics. Hydrochloric acid and nitro-hydrochloric acid are of less value than nitric acid.

Acetic acid has been used mainly in subcutaneous injections into the tumor. This method of using it, though probably not original with Broadbent, was strongly advocated by him in 1866. He was led to its use from noticing the effect of the acid on tissues under the microscope; that is, a shrivelling-up of the cancer cells without coagulation of the albumen. In 1867 Moore showed before the London Pathological Society a cancerous gland that had been injected, during life, with the acid (1 part to 3 parts water); the gland consisted of a thin shell with contents of a light

brown inodorous pulp containing pools of free oil, while on microscopical examination very few cancer-cells were to be seen. When successful, apparently a sloughing of the tumor takes place with discharge of the cancer elements, leaving a clean granulation-wound behind. Tillaux, Maisonneuve and Langdon, after trial, gave up the method as dangerous and inefficient; of late years, however, Gies, Duplouy and a few others have reported marked successes, but it is a method not destined to become very popular; it is intensely painful, and its use is followed by a more or less prolonged discharge.

Chromic acid is self-limiting in its action, as it is rendered inert by reduction to an oxide in the process of destruction of the tissues. It is very thorough, does not cause very much pain unless impure, and there must be cases where its employment would be valuable, care being taken to prevent toxic effects or a too deep penetration of the tissues.

Osmic, pyrogallic, salicylic and citric acid do not offer claims worthy of consideration, though the latter is said by Brandini and many others to give relief from the intense pain that often accompanies morbid growths.

Carbolic acid (though not belonging in this series) has been used with iodine in uterine cancer by Battey and others, who report good results. Its usefulness must, however, be very limited.

Chloride of zinc, the best of any of the metallic chlorides and perhaps most useful of any of the potential caustics, has been employed in cancerous growths for about one hundred and fifty years. All pastes containing this agent are practically modifications of the formulæ of Canquoin. Velpeau, Maisonneuve and a host of others have highly praised its use, while in our own time we find Butlin writing strongly in its favor. Apparently it causes more pain than its rival arsenic, yet it is not only more thorough

in its effects but hæmostatic besides. It may be used in varying strengths with some inert substance or with some other caustic, like corrosive sublimate, arsenic, chloride of antimony, etc. Maisonneuve and Girouard used it rolled out into small sticks or arrows which were inserted through punctures in the sound skin into the tumor itself; it has also been used to a small extent for subcutaneous injection in dilute solution. It forms a dry, white seal that separates in about ten days spontaneously, or in less time if a poultice is used. The surrounding parts may be protected by some greasy substance, and if necessary the slough can be scarified down to the underlying morbid tissues, and the zinc reäpplied until the entire growth is cauterized.

Sulphate of zinc, in the form of anhydrous powder, is highly recommended by Stephen Smith. He first penetrates the skin with a mixture of sulphuric acid and the salt, and then after leaving the zinc alone on the growth for three or four hours, any liquid residue is removed and a poultice applied, the slough separating in five or six days. Simpson of Edinburgh also used this agent with good results.

The following acid or neutral caustics may be dismissed with a brief mention; the use of any of them is restricted, and an extended discussion as to their merits or demerits would be out of place.

Sulphate of copper, dating its use as a caustic from the time of Galen, is mild and but rarely used now.

Corrosive sublimate is very poisonous and of limited value.

Chloride of iron acts very slowly and hardly like an escharotic.

Acid nitrate of mercury may be of service in ulcerated growths where a prolonged action is not required.

Nitrate of silver is of limited value, and permanganate of potash is even less escharotic in its action.

Chlorate of potash, used by Bergeron, Blondeau and later by Burow, is applied in powder to open cancers, and although it can hardly be said to have an escharotic action, it causes a shrinkage of the tumor besides an absorption of infiltration and a diminution of secretion.

Arsenic (arsenious acid) stands with chloride of zinc and caustic potash at the head of useful escharotics. The names and varieties of pastes that contain this agent as a basis are almost without number, but the simplest are undoubtedly the best. The use of the drug in cancer dates from the earliest times, and by many modern surgeons it is preferable to any other caustic. Some even claim for it a special action upon cancerous tissue, whether administered internally or externally. When properly applied it is harmless, less painful than zinc chloride, and easily managed. Manec investigated about one hundred and fifty cases treated by Frére Côme's paste, and was led to ascribe to the drug an elective action; he found that elimination takes place in five to eight days, and hence advised that the applications be made nine days apart, but if any general, systemic effect is desired this would not seem necessary. Subcutaneous injection has been tried, but with poor results.

In 1874 the younger Marsden, who with his father was surgeon to the London Cancer Hospital, published a treatise founded on statistics of a period covering twenty-two years and including about six thousand cases, and corroborated in great part by the resident physician, Dr. Crombie. He used a paste for the most part consisting of one-third mucilage of acacia and two-thirds arsenic; he does not deny that a return of the disease may take place, but the treatment can be applied to so many cases that are out of reach of the knife that it is wrong in his eyes to entirely disregard a therapeutic agent of so great value.

His method, which is very simple and has the merit of

having been extensively tried, is briefly as follows: Spread the surface of the cancer,—not over one square inch however at a time,—with the paste; over this apply dry lint, any superabundant paste being removed after a space of ten minutes. In twenty-four hours there will be swelling and redness of the surrounding parts, and a drawing pain lasting one or two days. At the end of two or three days a poultice may be constantly applied, a distinct line of demarcation being seen with ulceration, and a fissure separating the slough from the healthy tissue. In six to thirty days, according to size, the slough comes away leaving a healthy cavity. In some cases, it is necessary to apply the paste every second or third day until the desired effect is obtained, but no poultice should be applied until after the last application of paste, and no paste should be applied after the line of demarcation is formed. From this it is easily seen how partial or even bad results may be obtained from an unskilful use of the agent.

Helmkampff, in an extended article, advises that the strength of the arsensic be not over one-fifth or one-sixth that of the paste, lest too much inflammation be excited.

The extravagant claim made by some that return after destruction of a cancer by arsenic in particular is less liable to occur than after the use of other caustics or of the knife, is not borne out by careful observers.

Caustic potash is a well-known and efficient escharotic. With lime (equal parts) it forms Vienna paste; melted and run into leaden moulds it is called Filhos' caustic. Both forms are used considerably in France. Vienna paste is more manageable than the potassa alone, as it is less powerful and does not deliquesce nor run so much. It is rapid in its action, however, and aggressive, and for these reasons the milder arsenic is preferred by many.

Alveloz (aveloz), the acrid juice of one of the Euphorbiaciæ growing in northern Brazil, has been used by Janvrin

in uterine cancer, and a number of good results reported. He prefers it to any other caustic in early cases, while even in those far advanced it is palliative and diminishes pain; others besides Janvrin have also derived benefit from its use.

A short glance at the history of escharotics and of the men that have marked separate eras, either by the benefit or harm that they have contributed, will help to show perhaps some of the merits that really belong to this much-abused subject.

In the writings of Hippocrates we find mention of the use of desiccants and caustics for the purpose of producing a superficial slough and of removing the morbid parts in indolent and malignant ulcers. One of his applications contained hellebore, flakes of copper, arsenic and cantharides, and it seems not improbable that some of the ulcers he speaks of were epithelial.

Galen distinctly advises such caustics as sulphide of copper, tersulphide of arsenic and quicklime, and in speaking of excision of mammary cancer he says that, if it is intended to cauterize the remaining roots of the cancer, care must be exercised when this occurs near important parts.

Following Galen, but after a long lapse of years, we find Guido "lavish of his encomiums on arsenic;" soon after come writers such as Fallopius, Ossenius, Penotus and Borellus, each with some particular preparation containing the same caustic. But it is not until the latter part of the 16th century that the use of arsenic as a cancer-caustic is at all systematized and placed on a firm footing. At this time Fuchs practised with great success in England, Germany and Poland; his powder, called by one writer, *Pulvis Benedictus*, was made up of white arsenic ground to a fine powder, brandy *(aqua vitæ)*, a species of worm-seed dried in an exposed place and refined *(splendidi)* chimney-soot. All this was finely ground together and

kept in a well-covered glass vessel a year before being used.

For nearly two hundred years little progress was made. It was a prosperous time for quacks and home remedies. Among the latter is the Earl of Arundel's recipe, said to have been given him in 1638 by one of a family of cancer-curers. Later, in 1714, we find the MS. recipe belonging to a family named Pains, with this marginal note: "Used by my Father & Grandfather & Brothers and known as a thing excellent by long Practice in our Family of Pains." Both of these recipes relied upon arsenic for their activity.

In the middle of the 18th century the famous Plunkett flourished. He laid great stress on the extraction of cancer roots, and his recipe which is also said to have descended from his ancestors is interesting as given by Sir Spencer Wells:—

> ℞. Crowsfoot which grows on low ground, one handful, Dog fennell, 3 sprigs, } well pounded.
> Crude brimstone, 3 middling thimblefuls.
> White arsenic, same quantity. All incorporated well in a mortar, then made up into small balls the size of nutmegs and dried in the sun.

He sold the recipe to Guy, a contemporary, and it is also at this period and a little later that we hear of Martin, Pope, the younger Guy and Davidson—the latter enjoying a considerable reputation in our own State.

It remained for Frère Côme to crystallize the various and blundering methods of using arsenic in malignant growths. His paste, originally containing red sulphide of mercury, charcoal and dragon's blood, beside white arsenic, was the basis of all future arsenical pastes; it was simplified later and adopted into the French Codex. Very many cases were treated by Côme and other enthusiasts, such as Rousselot, Dubois, Dupuytren, Maisonneuve and Manec.

In 1834 Canquoin communicated to the Royal Academy at Paris the results in a number of cases treated by himself since 1824, with pastes of which chloride of zinc was the basis. Four years later appeared a complete exposé of his treatment, and although there is no question as to the virtue in his various pastes, the extravagant claims made by him must be taken with a good deal of latitude.

In 1847 Filhos recommended, especially in uterine cancer, the caustic that bears his name; that is, potassa and lime melted and run into moulds. This caustic, much prized in France for a while, is a slight improvement over the time-honored Vienna paste.

Eight years later, Landolfi, Surgeon-in-chief to the Sicilian army, made strong claims for pastes containing the chlorides of bromine, zinc, gold and antimony in various degrees of strength; he considered the gold as a specific in encephaloid cancer, and internally he gave chloride of bromine, fennel and hemlock. Many cases were treated under the diagnosis and attendance of Rokitansky, Meckel and others, but a commission being appointed to investigate the method, decided that it was only a modification of that of Canquoin, besides being more painful and not so efficacious.

At this same time the notorious Dr. Fell, an American practising in England, appeared before the public. He claimed that his treatment, imparted to him by the Indians, was new and depended on Puccoon (blood root) for its activity; it soon came out, however, that he used chloride of zinc, but he made such glaringly false statements and used the caustic so injudiciously that he brought a storm of wrath upon himself from educated, conservative practitioners. The accounts that the latter give of patients that had been through Fell's hands are simply horrible in many cases; in fact they remind one strongly of that which takes place under quackery at the present day and in our own State.

One recalls the story of the Emperor Gallienus cured of a sciatica after undergoing a thousand painful experiments: "Take," he said to his physician, "Take, Fabatus, two thousand sesterces, but withal, be informed I give them not for curing my sciatica, but that thou mayest never cure me again."

Meanwhile in 1859 one of the most notorious of all quacks was holding sway in Paris. This was the so-called "Black Doctor," a negro by the name of Vriés. He soon gained a large clinic among the laity, and in order to give him a fair trial Velpeau placed sixteen cases under his entire charge, at Charité. At the end of three months Velpeau, who had closely watched the cases, reported to the Academy, mainly as follows: No cases had been cured; the composition of the specific varied, it being aloes or iodine in England, but an inert vegetable powder of some kind in Paris; Vriés had no idea of cancer, nor of examining a patient; no promises had been fulfilled, and he had made false statements to the papers for publication. The patients were taken from his care, and later he was imprisoned, but it is needless to say that he had many devoted believers and followers.

A year after this another impostor was claiming attention in England; the Rev. Hugh Reed, whose treatment consisted in the use of some gas, probably chlorine, together with some internal medication that brought on salivation. At Reed's own request, Sir Spencer Wells investigated a number of his patients. In six he found no benefit from treatment, and in three others there was no cancer.

In 1870 another fraud, Buchanan, appeared on the scene. He claimed to use chlorate of carbon, which he sold for $5 per pound, but which later proved to be chlorate of potash.

It is needless to name any of the quacks that have flourished since this date, while the names of the few men that

have helped, from higher motives, to keep this method of treatment at its proper level can be found in any modern text-book of surgery.

Of the former class all practitioners know at least a few by name and deed. A more or less intimate knowledge of some of the most notorious in this city serves only to emphasize the one great fact that where so-called quacks do deserve credit in one case, there are many where they cannot be censured too severely. They are grossly ignorant of the nature of cancer, and, what is more surprising, of the action of the drugs that they use. They look upon the regular profession as bigoted and subservient to the traditions of European schools, and yet I have failed to hear one of them show the least intelligence on subjects in which they claim to be specialists. They do cure, so far as any one can cure, cancer,—that is willingly granted. When, however, one notorious swindler says that he has cured hundreds of cases, while another, his friend and supporter too, affirms emphatically and confidentially that the former has never cured a single case, but relies on defrauding and cheating a fellow quack for his own aggrandizement, it is difficult to make up one's mind that there is truth in any of their assertions. In fact, the healthiest sign, to be seen now, is the uncompromising condemnation that most quacks hold toward others of their kind. I have had too many proofs of this to leave any doubt in my mind of the fact.

An intelligent, skilful use of escharotics on the other hand is capable of doing a great deal of good in cases not suitable for excision; it will also serve to bring into good repute a method of treatment ignorantly employed by a class of men and women that has only selfish, brutal ends in view.

Let this be emphasized by a quotation from Butlin who speaks from a considerable experience. He says: "I would urge that it (the caustic) be used far more frequently in

surgical practice than it hitherto has been. I do not know whether it furnishes a better guarantee against recurrence, ... but it affords quite as good a guarantee, and I fully believe that its use is attended with a very small risk to life. The prejudice against the use of caustics is in our profession very strong, partly because they have fallen for the most part into the hands of quacks, partly because we are not in the habit of employing them and are in practice equally ignorant of their vices and their virtues." After speaking of the bone-setters, he concludes: "In the same way many of our patients with cancer fall, through an apprehension of the knife, into the hands of cancer-quacks, and are treated successfully, at least as successfully as we could treat them, by means of caustics. As we have endeavored to meet and defeat the bone-setter, so must we meet and defeat the cancer-quack; not by ridiculing his methods and refusing to credit the account of his successes, but by making his methods our own and by employing them with a far better knowledge of disease than he is ever likely to attain to."

To this might be added that if a specific germ should be proven as the cause of this worst of diseases, then we can look for some simple germicide that will serve to render all present treatment useless and antiquated.

What could be more earnestly desired by surgeons of the present day?

ARTICLE XIX.

ON PAIN IN THE SMALL OF THE BACK AND THIGHS.

By JOHN A. JEFFRIES, M.D.
OF BOSTON.

READ JUNE 12, 1889.

ON PAIN IN THE SMALL OF THE BACK AND THIGHS.

A CONSIDERABLE number of patients complain of pain in the back, or hips, the pain being the leading symptom, often the only one of which the patient is aware. This class occurs in all forms of practice, but tends to collect in the departments for nervous diseases of our hospitals and dispensaries. Owing to the paucity of symptoms and the importance of the diseases represented by these patients, they seem worthy of consideration. I shall endeavor to follow out the steps in diagnosis and point out certain parts of treatment, more especially methods chiefly practised by neurologists.

Naturally the diagnosis is one of differentiation from myalgia or neuralgia. The difficulty rests in the fact that pain in the nerves is merely a symptom and may be the only one of the most diverse complaints. Therefore, the only feasible way is to divide the area into parts, and examine them *seriatim* for hidden disease, arriving at a diagnosis of myalgia or neuralgia by exclusion. It is my custom to make the following divisions :

The spinal column ;
Its contents.
The muscles of the spine.
The hip joint.
The nerves of the lumbar region.
The nerves of the hip.
The kidneys.
The ovaries or testes.
The uterus.
The descending portion of the colon.

The distribution of the pain is of great importance in making a start. It may be diffuse, or run in tracts, or appear at isolated points along the course of a nerve. If diffuse, the patient will probably use the flat of the hand in pointing out its place; if local, the finger tips. In character the pain may be constant, intermittent, or paroxysmal; in nature, dull, sharp, shooting, gnawing, burning or throbbing.

Neuralgias, or nerve pains proper, have certain distinctive features. They follow the course and distribution of one nerve or of more than one. The pain may be referred to the terminal fibres, the nerve trunk, or both; or now to one, now to the other.

The pains are not steady but paroxysmal, and often dart in lines up or down. They also tend to spread during the times of most intensity.

The pains are not markedly increased by motion unless it produces increased pressure or stretching. They are often accompanied by paræsthesiæ.

The nerve trunk is generally tender, a condition most easily found at the points of exit,—the tender points of Valleix.

The spines over the roots of the nerve are usually tender,—tender spines of Trousseau.

There are often small patches of skin, usually near the points of exit, where the intensity of sensibility is increased. A touch produces intense pain, the Faradaic brush cannot be borne, a small coin at the temperature of the room may produce a shiver.

Flushing or paleness of the painful part is not rare; also, as Nothnagel has pointed out, there may be a certain amount of anæsthesia not only of the painful region but of the whole half of the body. Some impairment of motion is the rule.

Besides the characters of nerve pains, with few excep-

tions, but little value can be attached to the description given by the patient.

What constitutes pain, its essence, is unknown; neither the physiologist or pathologist has yet given an answer. It is clear that the final result must be referred to the higher perceptive centres of the brain; but pain in the periphery rarely arises from disease of the brain. Many authors, as Gowers, have advanced the theory that idiopathic neuralgia is due to a discharge from the ganglionic cells of the spine. The origin of these pains, however, must be classed among the unknown; and for practical purposes, in dealing with this subject, it is much better to assume a definite lesion or source of irritation of the nerves. In a considerable percentage of cases of neuralgia of this region disease of the nerves has been found; in the remainder, the so-called idiopathic cases, there is usually a personal, often a family, history of some taint, which it is more natural to regard as cause than result, and which may act in the periphery where it appears to, rather than in the cord. Very likely both are at times affected.

The question of reflected pain is probably closely connected with the origin of idiopathic pain. The theory, now undergoing constant extension, is that local trouble, as of the stomach, can produce reflected pain in a distant part, as the head. It is, however, only a theory, and does not rest on evidence; all sources of a general cause for both must be excluded before the theory is accepted. I have lately shown, in at least one case, that the blood is altered in such a way as to leave plenty of room for local action.

Besides the group of so-called reflected pains there is another small group where the pain is apparently referred to a wrong part, simply as the result of lack of training. We must not forget that the child seems to practise and to learn by study the sources and interpretations of many of its sensations.

But passing from the nature of pain to its significance,—all cases of pain in the region selected may be divided into two classes: the nerve pains, and the diffuse pains.

The diffuse pains are mostly due to myalgia, and belong to the group of lumbagos. If the pain is in the right side of the small of the back the probabilities are that we have a case of lumbago, so-called muscular rheumatism, before us. This probability becomes almost a certainty if there is a history of exposure or trauma, diffuse tenderness of the long muscles of the spine, or of the quadratus lumborum, increased by stooping, and no tender points or cutaneous hyperæsthesia. Under these conditions it is difficult to make a mistake, though the patient is often convinced that he has kidney trouble. Neuralgias are excluded by the absence of the characters of nerve pain. Disease of the internal organs causes bilateral pain, with few exceptions.

Trouble in or about the kidney must, however, be excluded. If inflammatory, there are the fever, deep tenderness best got from in front, and deep boggyness or fluctuation. With a reasonable amount of care in the physical examination danger of a wrong diagnosis is small. The only other trouble liable to lead to confusion is that state of dull pain in the region of one kidney due to local irritation as from a calculus. This pain closely simulates lumbago, but is not so dependent on flexion and extension of the spine; is said to be very sensitive to slight jarring motions as of riding. Inquiry may bring out a history of acute pain due to renal colic, which finally settles the diagnosis.

On the left side all that of the right side holds good, except that we have also to consider the pain resulting from fæcal accumulations near the junction of the transverse and descending portions of the colon. Such accumulations are common, and give rise to more or less pain usually located near the lower left free ribs. Tenderness is less marked than in lumbago, and the pain is relatively but little

affected by stooping. The diagnosis may be confirmed by palpation, the patient lying on the back with the thighs flexed. A regular motion of the bowels does not preclude this condition.

When the pain is in both sides of the back the diagnosis is more difficult, and it is always necessary to examine the whole of the region. The bones of the spine should be carefully examined for undue yielding to pressure, for tenderness and irregularities of form. The line and curve of the spine should also be examined, while the patient is stooping, for irregularities, and any signs of rotation noted. If the spine passes muster it is probably sound. Slight or even marked irregularities of the spine are often the result of occupation, and of course found in patients with pain in the back. In such cases the other symptoms are wanting.

Besides the bone diseases of the spine a certain number of cases occur where the patient apparently has lumbago, but careful examination proves the trouble to be in the spine. In these the pain often runs way up, and the history of rheumatism is usually clear. The trouble seems to be really a rheumatic affection of the ligaments of the spine.

Acute kidney trouble may come on with pains closely resembling lumbago and little if any fever or other constitutional symptoms; then the only means of detection is by examination of the urine. Such cases are rare, but I have had one which very nearly escaped my notice in the hurry of a large out-patient service.

Diffuse pain with no special tenderness is very common in the groups classed as oxaluria and lithiasis.

The pains from diseases of the other viscera can scarcely be confused with lumbago. Those of the female genital organs are referred chiefly to the sacrum, are not so dependent on stooping, are dragging in nature and are usually recognized by the patient. Any doubt should be cleared up by a proper examination.

Excess on the part of the male often produces pain across the back resembling lumbago, but in such a case tenderness is not limited to certain muscles, nor does stooping cause so much pain, but rather tends to relieve it. All are familiar with the peculiar facial expression of this class of patients.

It must not be forgotten that lumbago may be the first symptom of one of the exanthemata, especially small-pox. If new growths are at the bottom of the trouble, they should have been detected during the examination.

Having ruled out the obscure causes of pain in the region, we have left lumbago used in its widest sense. Of its pathology we know little. For working purposes I am in the habit of making a division into three groups:

Traumatic lumbago.
Myalgia, so-called muscular rheumatism.
Diseases of the lumbar aponeurosis.

The essential difference in traumatic lumbago is the trauma. The patient has suddenly been seized with pain and impairment of motion after a sensation "as if something had snapped in the back." It is customary to ascribe this to a strain. In the majority, however, the sudden onset is simply the first perception of an attack of myalgia, which very naturally coincides with some unusual motion, and as such offers nothing peculiar. A few of these cases are due to a strain. When this is the case, during the first few days the tenderness is not so diffuse but limited to, or accentuates in, some small area. Œdema and swelling have not been observed. In the two patients of whom I have notes, the cause was in one lifting a heavy weight, in the other sneezing while stooping over to wash the face in a bucket on the ground.

The myalgias form the bulk of the cases, it may be in only one side or in both, or in the quadratus lumborum muscle. The symptoms have been so fully described that they need not be repeated.

Trouble in the aponeurosis is usually rheumatic or gouty in nature. The symptoms are much the same as in myalgia in the mild cases. As a whole the trouble is much more severe, bilateral, accompanied by fever, and intractable. A distinction where possible must be made on these lines; if quickly cured it was a case of myalgia.

So far we have been dealing with diffuse pain, not limited to the region of a nerve. The more frequent and difficult class of neuralgias remain. The characters of these pains having been pointed out, the subject of diagnosis can at once be taken up. As a diagnosis of idiopathic neuralgia can only be made by exclusion, a method similar to that for lumbago is both quickest and most sure. As, however, a division into lumbar neuralgia and sciatica is insufficient, for purposes of diagnosis it is better to make subdivisions according to the major nerves as follows:

LUMBAR NEURALGIAS	Posterior branches. Ilio-hypogastric. Ilio-inguinal. Genito-crural. External cutaneous. Obturator. Anterior crural.
SACRAL NEURALGIAS	Posterior plexus. Sciatica.

Disease of the bones of the spine may produce neuralgia by irritation of the roots of the nerve. Sometimes the pain comes early, when the real trouble may be overlooked. Children have relatively little pain in the back in this disease. As any of the roots may be affected, the pain has no definite seat. The spine should be carefully inspected, especially in children where the ordinary neuralgias are rare. The pain offers some indication of the trouble; it is very susceptible to slight motions and tends to be relieved by extension or lying down. Of course if the deep reflexes are abolished, or even much increased, the case is not one of neuralgia but of some spinal trouble.

Disease of the sacrum is said as a rule to pass for some time as a sciatica. Before the necrosis has produced signs on the surface there does not seem to be any way of making a diagnosis except by examination through the rectum. Practically the physician must rely on the constitutional symptoms to give warning, and he must search till something is found.

Disease of the sacro-iliac joint is fortunately rare; it may come by itself or with disease of the sacrum. It frequently passes for sciatica. The pain may be at the joint, in the buttock, the thigh or even the knee. The distinctive points are that the joint is tender to direct pressure, as well as to pressure made on the two iliac bones from side to side.

The disease of the cord which offers most danger of confusion is locomotor ataxia. Pain in the limbs is often a very early symptom and taken for sciatica or rheumatism. The accompanying disturbances of sensation are of questionable value by themselves, since most nerve troubles in the legs have this symptom. A double sciatica is rare, in itself suspicious. The knee-jerk should be examined and also the pupils; if the first is absent and the pupils react to accommodation but not to light, tabes must be diagnosticated.

Meningitis limited to the lumbar region may pass for neuralgia, either in the first stage of acute trouble or later in chronic. The fever should give warning and draw attention to the pain being on both sides, the general spinal tenderness, the increase of the reflexes, the trace of muscular rigidity, the cutaneous hyperæsthesia. Pain is not the only marked symptom. Tumor in the lower part of the cord is to be distinguished on the same lines.

Before leaving the region of the spine psoitis must be mentioned. The trouble is insidious, and owing to the long nerves perforating the muscle may give rise to a lumbar neuralgia before outward symptoms appear. The pains

are along the groin and in the surface of the thigh. But it is rare for a psoitis to exist without a set position of the thigh which is flexed and rotated outwards so as to relax the muscle. There are also the fever and tenderness of the muscle.

Renal colic at times closely simulates lumbar neuralgia; in marked cases the pain is too intense. In milder cases the question is not so easily answered. Drawing up of the testicle, pain along the ureter and tenesmus of the bladder all point to a calculus. But both drawing up of the testicle and tenesmus of the bladder may occur in simple neuralgia. The urine should be examined and inquiries made for previous attacks.

The dull dragging pains of old uterine troubles need no note, and the same may almost be said of acute trouble. The pain covers a large part or the whole of the area supplied by the lumbar nerves, a rare thing for a neuralgia. There are also the local symptoms in the organ. The rectum is an occasional source of pain in the sacrum, usually of a dull and gnawing character. Local examination settles the question. For foolish reasons patients are very fond of describing pain which they know is in the rectum as being in the sacrum.

New growths anywhere in the back of the sacrum are liable to cause a neuralgia, either lumbar or sciatic. They must always be borne in mind in intractable cases or in patients at the cancer period of life. The other symptoms are too variable to allow of consideration, and a diagnosis can only be made by finding the tumor. Pelvic exudations may produce the same results.

Troubles in or about the hip joint still remain to be considered. One of the first symptoms may be pain in either the sciatic nerve, the obturator—pain located at hip or knee joint—or along the groin as stated by Gowers. Pain during childhood in any of these regions calls for careful

examination of the hip joint. In advanced cases simple inspection is sufficient, but in the very first stage it is only by careful inquiry as regards the shape and smoothness of the bones, the tenderness of the joint and slight impairment of motion that a correct diagnosis can be made. In hip disease a limp usually comes before the pain,—a point of considerable value if noted.

In this connection it is well to remember that simple cutaneous neuralgia of the anterior face of the thigh will often produce all the appearances of hip disease. It is recognized by the extreme sensibility of the skin and the absence of physical joint symptoms.

In the adult arthritis deformans may cause the same pains as hip disease.

Herpes is often ushered in by severe pain, a neuralgia lasting for some time before the skin lesions appear. If the patient describes the pain as burning, or if cramps in the same region are marked, I am always suspicious. A distinction, however, cannot be made until the cutaneous symptoms appear. This is unfortunate, as the physician sometimes gets into trouble for not being omniscient; it is hard for the patient to believe counter-irritation was called for.

Sciatica is so intimately connected with the subject of this paper that it cannot be passed by, though the pain extends well out of the region. It differs from other nerve pains in that structural lesions are more prominent, an organic basis being found in most cases of any duration. With the deeper grip taken by the disease other marked symptoms occur, as pronounced anæsthesia, paræsthesia, atrophy or even paralysis and true trophic disturbance. As a rule the trouble is unilateral, but this is not invariable. If the trouble is severe and accompanied by pronounced symptoms other than pain, it must be classed as a neuritis. The distinction between double sciatica and neuritis limited to the legs must be made on the same lines. If the knee-

jerk is impaired there can be no doubt it is not functional. A history of alcoholism or other poisoning points to a neuritis.

Having located the pain and excluded the organic causes of the mischief, the functional causes are still to be considered. It is well to begin by carefully examining the area of pain for local causes, as scars, small tumors, disease of the bones, enlarged lymphatics at the point of exit; also to inquire for any habit which may produce mild continuous pressure, as using a chair which does not allow the feet to rest on the ground.

The diatheses still remain. They probably all act in virtue of the blood being in a pathological state, as anæmia, debility, the gouty tendency, malaria, poisons. Rheumatism is often given as a cause, but if any connection with acute articular rheumatism is implied the word had much better be dropped. According to my figures but few in a hundred cases of neuralgia have had rheumatism. Whole families may be martyrs to muscular rheumatism and neuralgia for generations, and still be exempt from the articular trouble.

Besides the symptoms given as characteristic of nerve pain in general certain neuralgias of this region are liable to give rise to other disturbances. Ilio-inguinal neuralgia often causes difficulty of motion and impairs the use of the legs. Genito-crural neuralgia may cause drawing up of the testicle and desire to micturate, and Romberg describes a case in the male where the sexual passions were greatly increased. Obturator neuralgia, an early symptom of hernia, may involve the adductor muscles as well as the hip or knee. The peculiar limp and bend due to sciatica is familiar to all, but too closely resembles some of the distortions due to lumbago to be of much use in diagnosis.

Railroad spine and spinal irritation still require notice. In spinal irritation the pain is chiefly up and down the spine, the posterior processes are very tender, and hyperæsthetic

spots are frequent on the sides and front of the body. The diagnosis between this complaint and spinal neuralgia is often one of fancy.

The pains of railroad spine are twofold: those of general lumbago and those of spinal neuralgia, and both may exist at the same time. The diagnosis is based on the history of trauma and the exclusion of other troubles as in ordinary lumbago. Most, if not all cases of railroad spine which suffer from pain in the lumber region have been injured there.

Treatment may be divided into three parts: relief from acute symptoms, treatment of the nerves, and treatment of the condition which directly or indirectly induced the trouble.

In the first group we must rely on the analgesics, of which morphine, cocaine, antipyrin and salicylate of soda are the most effective. With the use and abuse of morphine all are familiar; the same is true of cocaine.

Antipyrin or phenacetin given by the mouth at times work like a charm and are worthy of trial. I begin with a ten grain dose and repeat, and have found few cases where more than three doses were of advantage. Five grains is at times enough. The local application of antipyrin dissolved in water close to the stem of the nerve is often followed by happy results; dose three to five grains. The chief objection is quite lively burning.

Salicylate of soda is a valuable drug in many cases. Not only is it the first resource if rheumatism really exist, but also is a powerful analgesic in many forms of nerve pain. This action of the drug does not seem to be generally known in our vicinity, but has for a long time been recognized on the continent. A small dose is often sufficient; thus in the winter of 1886–7 I had in my care an old woman who suffered greatly from pain in the obturator nerve resulting from arthritis deformans of the hip, to whom a dose of five

grains taken at night made the difference between one passed in sleep and one in agony.

All are familiar with the acute symptoms from the brain, heart or kidneys, at times induced by this drug, but it does not seem to be as clearly recognized that the prolonged use of the drug is liable to injure those organs. The question has all been gone over in regard to the use of the drug as a preservative for foods.

In the second division we have three natural sub-divisions: remedies applied to the surface, electricity, and internal remedies. The use of analgæsic preparations applied to the skin is hardly practicable; the area is large, the nerves lay deep, and the dose is unknown. Counter-irritation is of value; the choice of the agent, from a liniment to the actual cautery, depends upon the severity of the symptoms. In pronounced sciatica fly-blisters are almost inert. This is the place for the cautery; the burns should be superficial, heal in a few days and distributed along the course of the nerve.

Massage is often of value but should never be employed till all serious trouble has been excluded.

The old household remedy of dry heat is always in place for lumbago and not a few neuralgias. The salt bag, a saucer or a hand-iron are always at hand.

Electricity is undoubtedly one of our best resources if properly applied. Faradism is of use in the form of the brush where paræsthesia is marked or a temporary counter-irritation is desired. For the pain and nerve disease, if any exist, galvanism is indicated. The direction of the current up or down is of no import; not so with the poles, the anode is the best for simple pain. In neuralgia a large electrode should be placed on the back and the surface and track of the nerve slowly gone over with the positive pole. No quick motions or breaks in the current are allowable. In sciatica, that is neuritis, a powerful current, 15 to 25 milliamperes,

will often do good where less is of no use. When strong currents are used, large electrodes are required to save the skin. Strong currents should only be used after trial with weaker ones, and carefully watched. At times, especially in recent cases, they increase the pain, and do harm. As a rule five minutes is enough. I am in the habit of applying the positive pole for three minutes, then inquiring for the painful points which remain and attacking them. The negative pole can often be used with advantage in cases where the positive is well borne. Do not forget the indifferent pole but slide it along from time to time, otherwise a small crop of blisters may result. The applications should be made daily; if nothing is gained in a week there is little hope of a cure.

In muscular pains, lumbago, the current should go straight through the muscle, one pole in front the other behind. My figures seem to show that the kathode and strong current, fifteen to twenty-five milliamperes, should be used. The prompt relief often produced is incomprehensible but undoubted. The Faradic bathing does not seem to me so efficient. Lastly, it is as much out of place to monkey with electricity as with a lancet.

Cold, either in the form of ice-bags or some of the volatile sprays, is certainly of value in sciatica. But where feasible the first indication is rest. The method laid down by S. Weir Mitchell of rest in bed with a hip splint, ice, massage, the cautery and galvanism, probably represents the best the physician can do in sciatica to-day.

As the causes of pain in the region are infinite, a consideration of the general therapeutics would require a volume.

ARTICLE XX.

THE

NON-RADICAL TREATMENT OF CANCER OF THE UTERUS AND VAGINA.

By HENRY C. BALDWIN, M.D.
OF BOSTON.

READ JUNE 11, 1889.

TREATMENT OF CASES OF CANCER OF THE UTERUS AND VAGINA, NON-RADICAL,

AT THE FREE HOSPITAL FOR WOMEN, AND THEIR SUBSEQUENT HISTORIES.

It is generally accepted as a fact which pathological and clinical evidence prove, that no treatment of cancer of the uterus will be successful unless employed in the earliest stages of the disease. The facility with which the disease infiltrates and invades the adjacent tissues, and the impossibility of following the disease into its new fields of invasion, speedily convert a disease that at first is local and that can be eradicated, into one that has become hopelessly extended.

As regards treatment, then, cases of cancer of the uterus may be divided into two classes:

First,—Those cases where the vicinity of the uterus is entirely free from carcinomatous infiltration and where the disease is limited to parts that can be entirely removed.

Secondly,—Those cases where the uterus has become fixed, and the surrounding parts so involved by infiltration of the disease that only palliative measures can be employed to relieve pain, to remove an offensive sloughing mass of disease, and to reduce hæmorrhage by removing vascular excrescences.

In the first class of cases where the radical operations of extirpation of the uterus and high amputation are performed, this paper has nothing to do. It is a report of the treatment of the second class of cases at the Free Hospital for Women, under the care of Drs. Baker, Davenport, Elliot and Strong, and their subsequent histories.

From the opening of the hospital in 1875 to the beginning of the present year, there have been forty-nine cases of cancer of the uterus and vagina admitted for treatment. Twenty-eight, or 57%, have been cases where the disease had so infiltrated and involved the adjacent parts that only palliative measures were possible.

With one exception all the patients had been married. In one case there was no history. Two had borne no children, five one child, five two children, five three and four, and ten five and more children. This is in accord with the rule enunciated by Gusserow and confirmed by the statistics of Hofmeier,[1] that the greater the number of children, the greater the predisposition to cancer.

One case occurred in a woman under 30, twelve (the largest number) in women between 30 and 39, seven between 40 and 49, seven between 50 and 60, and one in a woman over 60 years. Hofmeier, in a report of 548 cases, found the largest number to occur in women between 40 and 49, and the next largest number between 30 and 39. Comparatively few cases occurred after 60, and very few before 30.

An interesting and important point is the time that had elapsed between the first symptoms of the disease and the examination which showed the condition of the patients.

The average duration was eleven months. In fifteen cases the average period was under five months.

It is interesting to compare these periods with the periods in cases where the radical operation has been found possible.

In the eighteen cases of radical operation at the hospital, the average duration of the symptoms before examination was $6\frac{6}{7}$ months. In twelve of these cases the average duration was five months.

Pawlik[2] reports thirty-three successful cases in which there had been no recurrence of disease after intervals of from

[1] Zeitschrift für Gebert. et Gyn. 1882, p. 272.
[2] Wiener Klinik, 1882, p. 463.

nineteen years to one year, in which the average duration of symptoms had existed a little over five months before the operation.

The fact that in fifteen cases where radical measures were impossible on account of the extension of the disease, an average time of but five months had elapsed since the first sign of trouble was noticed by the patients, emphasizes the fatality of delay, and the urgency of immediate examination and treatment in all cases where suspicious symptoms occur.

Reamy[1] says in regard to this, that epithelioma of the cervix is probably always at first a local disease, and probably generally curable in this local stage. But a very large percentage seen with a view to proper treatment are already incurable from delay.

Pawlik[2] gives a striking illustration of this. A woman who had given birth to twins and whose uterus was free from any trace of disease at that time, presented herself in less than three months with a cancer which was too far advanced for operation and of which she soon afterwards died.

The usual history in these cases is like the following:

Case I.—Patient 36 years, married, nine children. Previous health good. Two months and a half before admission began to flow, and has flowed off and on ever since. Discharge of pus for past three weeks. Examination showed the whole cervix of the uterus gone and the vaginal walls extensively infiltrated.

Case IX.—Patient 47, married, one child and one miscarriage, general health good. Five months ago thought that she had leucorrhœa and began to grow weak. Has had no pain and no hæmorrhages. An examination showed the whole uterus involved and the disease had extended to the vagina.

[1] Transactions Am. Gyn. Soc., 1888.
[2] Wiener Klinik, 1882, p. 408.

In seventeen cases the first symptom was a hæmorrhage; in nine cases it was leucorrhœa which persisted and became offensive and bloody. In eighteen cases hæmorrhages, foul leucorrhœa and pain were all associated when seen.

The existence of pain is significant, for, according to Sims[1] and others, pain is not an attendant of cancer in its earliest stages. It belongs to a late period characterized by inflammation and its products.

In but one case was cancerous cachexia mentioned as present. Dr. Goodell says that cachexia is absent in about half the cases, and many of the patients with cancer present a buxom appearance with rosy cheeks.

The patient in Case VII. was a married woman of 31 years, with no children. Her general health had been and was good. She came for leucorrhœa, the first she had ever had, which had persisted for seven months and was increasing. She had no other symptom. Examination showed that the uterus was fixed by cancerous infiltration laterally, and that it had involved the vagina extensively.

Such cases illustrate how women in apparently perfect health, with no alarming symptom, may be found to have a hopeless extension of the disease from its point of origin. These emphasize the necessity of a careful ocular examination by the physician in every case where local symptoms exist, *however slight they may be.*

There is nothing that I can find about the pathology of these cases except that one case was cancer of the body of the uterus, and the remaining twenty-seven cases were of the cervix or portio vaginalis.

After a long account of cancer, Hippocrates[2] pronounced it when fairly developed entirely incurable, and says that it is better not to apply treatment, for then the patient might die quickly, whereas if not treated, the patients often hold out a long time.

[1] Am. Journal Obstet., 1879.
[2] Trans. Am. Gyn. Soc., 1881.

The consensus of gynæcologists of to-day would not agree with this opinion.

Thomas[1] divides the treatment of these cases into two classes.

First, where generous diet and tonics are employed, and where loss of blood is prevented as far as possible with astringents, and fetid discharges overcome by antiseptics.

Secondly, where all these measures are carefully followed out, and in addition as much as possible of the disease is removed. This latter plan, he says, adds many years to the aggregate of life, and in individual cases renders existence far more tolerable, even if it fail, as it does as a very general rule, to check the progress of the disease for long periods.

Goodell[2] says that he has repeatedly seen, after scraping the cervix in cancer, the complexion clear up, and all cachectic symptoms disappear, and adds: "I remove all the disease possible and have had most excellent results."

Reamy[3] says that it is remarkable how a woman who is anæmic, with loss of appetite, after curetting and the use of zinc chloride becomes cheerful, her complexion gets better, and she gets up and goes to work.

Sims[4] says, that sometimes we see cases in a very advanced state, where the vagina is shortened and half obliterated, where the cervix uteri has been destroyed, where the uterus has become immovably fixed, where pain and fetid discharge conjoined with sleepless nights were rapidly exhausting the vital powers, and yet by operative measures these were all arrested for a time, and life was somewhat prolonged and rendered more comfortable. This is the rule, but there are occasional exceptions. Almost every case may be benefited by operation, even where there is no hope of giving entire relief.

[1] Trans. Am. Gyn. Soc., 1879.
[2] Ibid., 1877.
[3] Ibid., 1888.
[4] Am. Jour. Obstetrics, 1879.

Dr. Baker[1] says, that although unable to remove the disease thoroughly, much may be done for the comfort and temporary relief of the patient. All sloughing tissues and vascular excrescences may be removed with curette and cautery, which will render the condition far more endurable.

The method of treatment at the hospital is after etherization to place the patient on her side in Sims's position. A Sims's speculum is then introduced and the growth curetted and cut away as thoroughly as possible. The hæmorrhage is considerable, especially while the cancerous growth is being removed. It usually diminishes as the underlying sound tissue is reached. The whole surface is then thoroughly seared with the actual cautery at red heat, which destroys the tissues for an eighth to three-sixteenths of an inch deeper, stops bleeding and forms an eschar which prevents septic absorption. Sometimes, if there is still hæmorrhage after the prolonged use of the cautery, the surface is covered with styptic cotton, and the vagina is packed with cotton tampons. The packing is removed from the vagina in twenty-four hours. The styptic cotton often adheres so closely that it comes away only after some days—often with the slough from the use of the cautery. No force should be used to detach it, on account of the danger of hæmorrhage from tearing the tissues and of septic absorption from the freshly exposed surface as the slough from the cautery separates.

This treatment with curette and cautery is followed as soon as possible with an application of zinc chloride to destroy the tissues still deeper. In applying the zinc chloride the vagina is protected from its action by the free use of bicarbonate of soda, and the caustic is applied to the parts desired by means of pledgets of cotton moistened in a solution of equal parts of water and zinc chloride. The slough usually comes away in about ten days, and should

[1] Am. Jour. Obstetrics, 1882.

leave a clean granulating surface. If the growing disease is found to be present, or infiltration still remaining, the application of the zinc chloride is renewed.

This treatment was repeated several times in some of these cases, with the result of retarding the progress of the disease and of materially ameliorating the symptoms.

In four of these cases the peritoneal cavity was opened during the curetting, in two cases in three places. Yet in none of these cases did any bad symptom arise in consequence.

In one case the operation was not thoroughly done on account of the enormous hæmorrhage from the use of the curette.

In the after-care of these cases much may be done for the comfort of the patients. As the disease progresses, the pain must be relieved by the free use of opium; feted discharges corrected by vaginal douches containing disinfectants; hæmorrhages checked by the use of astringents. The excoriation of the skin from the vaginal discharges should be guarded against by the use of oxide of zinc ointment. Every effort should be made to maintain the general health by means of tonics, generous diet and good hygienic surroundings.

In no case was there any death from the operation; all received temporary relief, though of very brief duration in some. Four weeks was the shortest duration of life after the operation.

In three of these twenty-eight cases I have been unable to learn any history since they left the hospital. One patient was discharged incurable with a return of the disease. She was up and about, and felt better than for months.

In the second case there was a return of the disease with pain and leucorrhœa one month after the operation. The patient refused further operative treatment, and went home to the Provinces.

The third patient had no return of the disease when she

left the hospital, and was discharged relieved. One case was cancer of the body of the uterus. She died 10½ months after leaving and three years from the beginning of her symptoms.

Two patients who had previously been operated on elsewhere, died 13½ months and 1 month after the operations, and 27 months and 16 months from beginning of symptoms. In twenty-one cases of cancer of the cervix which have resulted in death, the average duration of life after operation was 8¼ months, and the average duration of life from the beginning of the symptoms was a little over 20 months.

Jackson[1] says that cancer of the cervix, if left to itself, requires about 17 months to destroy life, and cancer of the body 31 months.

Sims[2] gives the average duration as 18 months.

Pawlik[3] states that according to Lebert and West the average duration from the beginning of the disease is 16 or 17 months.

With these figures as a working basis there was an average prolongation of life of at least two months in each case.

In two cases there was no local return of the disease. In two cases in the death certificate the cause of death was given as phthisis, showing that there were no marked local symptoms. In seven cases I could get no subsequent history except the dates of death. In the remaining cases the disease progressed with a gradual return of the former symptoms.

Besides the prolongation of life and the respite of their symptoms, the mental relief to the patients from a palliative operation cannot be overestimated for the renewed courage and hope it gives them.

The following case is a striking illustration of the value in palliative treatment of the most thorough removal of all the disease possible.

[1] Trans. Am. Gyn. Soc., 1883.
[2] Am. Jour. Obstetrics, 1879.
[3] Wiener Klinik, 1882, p. 408.

Case XXVI.—Patient 35 years old, married, one child. Nine months previous noticed a yellowish discharge from the vagina, which gradually assumed the color of blood and water. For the last two months foul odor. Three or four napkins required daily. No especial pain, but a dull ache in the front passage. Tired feeling since last summer.

Examined by Dr. Charles P. Strong, who made the diagnosis of cancer and found that the growth had extended over the posterior fornix of the vagina. She was curetted, and in the operation the peritoneal cavity opened in three places posterior to the uterus in the left fornix, and the broad ligament on the right side opened. The hæmorrhage was controlled by stitches. The uterine canal was dissected out with urethroms, so that the probe entered less than ¾ of an inch.

Zinc chloride was applied later and was followed by a large slough. She made an uninterrupted recovery and has been under regular observation since. She was examined last week, 18 months since the operation, and is free from any signs of local trouble, and has the appearance of a woman in perfect health.

The conclusions that may be drawn from a study of these cases are in accord with the conclusions of other observers with larger experiences.

First:—They show the importance of an immediate ocular examination in every case where local symptoms exist, however slight, in order to determine the presence or absence of cancerous disease; and the urgency of immediate operation in cases where disease is present, as is shown by the fact that in fifteen of these palliative cases the symptoms of disease had extended less than five months.

Secondly:—The average duration of life is increased by operative treatment, non-radical, which answers the popular opinion that operative measures hasten rather than retard the disease.

Thirdly:—The mental and physical condition of these

patients, during the time they may live, is rendered much more comfortable.

Fourthly:—The dangers from operative treatment, non-radical, have been overestimated and are not great, as shown by these cases where no death occurred, and where in four the peritoneal cavity was opened, twice in three places.

Fifthly:—The need of repeated and thorough operative treatment and constant watchfulness. The patient should never be lost sight of, but should be regularly examined, and any new outbreak of the disease immediately attacked.

By such endeavors more may sometimes be accomplished than was hoped for, as is shown in Case XXVI., where the patient is alive and apparently well 18 months after her treatment in the hospital.

ARTICLE XXI.

ASEPTIC OBSTETRICS.

By WILLIAM E. BOARDMAN, M.D.
OF BOSTON.

READ JUNE 11, 1889.

ASEPTIC OBSTETRICS.

WITH reference to many, notably the acute diseases, we recognize to-day consecutive clinical and pathological phenomena which enable us to establish what is called their "natural history," a generally accepted term which may possibly admit of a thoroughly materialistic interpretation, but which furnishes to most minds an argument in favor of the doctrine that "Disease is a part of the plan of creation,—one of the myriad expressions of divine thought."

Modern researches, which have developed this knowledge of diseases, have naturally stimulated renewed investigations regarding their origin as part of this "plan," and to-day we are in possession of etiological facts which were not before possible, though vaguely suggested ages ago and repeated in succeeding epochs, these results having been obtained through modern means of scientific study and research. Particularly is this true of the so-called zymotic diseases, with regard to which the evolution of the prevailing ideas as to their origin and immediate cause forms a most attractive study.

The history of former periods, even the most remote, records the occurrence of epidemics, of various kinds, which have devastated entire regions and have inspired contemporaneous medical thought with the endeavor to assign causes for their origin and spreading. Hence there have been transmitted to us various hypotheses, most of which have been devised to include a corruption of the atmosphere as the necessary element in the production of the diseased conditions. And it is interesting to learn that some of the writers even of

antiquity assumed to explain the origin of the pestilences by the entrance into the human system of living animals or low organisms, beings which floated unseen in the atmosphere. The improvement in the microscope and its more extended use led to a more definite advance towards the appreciation and acceptance of the theory of a *contagium vivum*, from the discovery of the existence of spermatozoa within the body, which was considered to establish the fact that animals may and do live within the human system, and then the recognition of infusoria in the atmosphere easily led to the theory that certain diseases were caused by the entrance of these into, and their multiplication within, the body. But the means and methods of investigation were too imperfect to admit of an accurate demonstration of this relation of cause and effect, and it has remained for the scientists of our day to prove the exact relation by the only proper scientific method; that is, investigators first recognized and demonstrated the constant association of certain elements with special diseases, and finally the chain has been made complete, at least in the case of some affections, by properly conducted experiments which have shown indisputably that these associated elements or germs are efficient to originate the specific diseases. In other words, the gradual progress of scientific thought and study and the continued improvement in the methods and appliances for physiological and pathological investigations have enabled the master minds of successive generations to furnish additional facts and information which, slowly but surely, have led up to a final demonstration of the actual relation of cause and effect, which is exhibited by some of the infectious diseases; and the promise is good that in time, possibly in the near future, our knowledge with regard to other diseases will be increased in a similar direction.

The affection which is now generally regarded and described as puerperal septicæmia and which has always

prevailed in varying degrees of intensity, but under different names, and been interpreted in various ways, according to the doctrines of etiology and pathology which have been advanced from time to time, is an apt illustration of the line of thought which is suggested by these brief preliminary observations which I have made. From the time of the earliest records which have been preserved, to the period of the "dark ages," it was the general belief that puerperal fever was the result of a poisonous condition of the blood. It was imagined that from various accidents, chiefly from the suppression of the lochial discharge, "the blood and humors, accumulated during pregnancy, returned into the general venous system, there became corrupted and were capable of directing themselves towards an organ in which they determined inflammation; at other times they remained in the uterine veins, there putrefying and generating fever." The doctrine of humoralism, which prevailed for so many centuries, founded chiefly upon mere hypotheses which had their origin in superstition or the fanciful interpretation of observations, admitted of no other plausible explanation of the phenomena which were observed in this disease. In later times, when autopsies became more frequent and the knowledge of post-mortem appearances was more exact, solidism came into vogue, and for a time the humoral pathology was in abeyance, until about two centuries ago a reaction again ensued and, in the succeeding century, this doctrine was elaborated so as to include the idea of a fermentation within the human system, which could be induced by the action of elements introduced from the outside. At first the decomposing lochial discharge was regarded as the immediate and only efficient agent of the kind. Later the ancient idea of a nosocomial atmospheric influence was revived, but in a more definite form, as applied to the contamination of the air by emanations from diseased bodies; still later, by foulness occasioned by

inadequate ventilation and faulty sanitary conditions of hospitals and dwellings; and, later yet, the idea of direct inoculation by contagious matter, carried from decomposing wounds or cadavera, was quite generally accepted. Meanwhile, the true theory of the zymotic nature of the disease, as due to miasmata, was suggested, and during nearly two centuries this has gradually been elaborated. Originally, the theory with regard to the agency of the miasmata had no scientific basis to substantiate it, and the hypotheses have always required, as a necessary element of their acceptance, the *divinum quid* of Hippocrates,—the something which is beyond our comprehension, until the microscope enabled investigators to formulate the microbian theory of zymotic diseases and to recognize the occurrence of specific bacteria in connection with puerperal disease, and the pathologists have succeeded in tracing the intimate relation of these organisms with the various morbid processes of this affection. As the latest theory with regard to the rôle which these microbes play in connection with the disease under consideration, as well as with infectious diseases in general, we have recently had presented the results of investigations and experiments which are said to demonstrate that the element, which is directly concerned in inducing the diseased phenomena, is a chemical one, an alkaloid which is generated by the microbes, in other words that the bacteria merely serve as vehicles for the generation and transportation of the poisonous virus. Accepting this latest contribution to our knowledge of the origin of the septic processess, we still are compelled to rely clinically upon the practical deductions derived from the more prevalent microbian theory of disease, the value of which in surgery and obstetrics, during the last two decades, is attested by the universal experience both in hospital and private practice.

It will be unnecessary for me to go into minute details in order to explain this theory, for, without doubt, all of

you are quite familiar with it. I will merely mention, perhaps as a proper preliminary to what I shall have to say later, that what we have lately regarded as puerperal septicæmia requires the presence of pathogenic germs, or bacteria, within the utero-vaginal canal; a solution of continuity therein and an adequate susceptibility of the individual. In regard to the exact nature of this so-called susceptibility, we have no precise knowledge, any more than we know why, sometimes, one of two children, in the same household and under similar exposure, will take the scarlet fever and the other will escape. In a general way, it has always been observed that an individual who is in a debilitated state, mentally or physically, is more prone to exhibit unfavorable symptoms after wounds and injuries of any kind, and the general condition of women after confinement is notably such as to invite the occurrence of a wound disease, while the parturient canal, after labor, presents an extensive wounded surface which offers a fertile field for the sustenance and multiplication of bacteria, which may be brought into contact with it by the atmosphere or by other means, and numerous openings through which they may effect an entrance into the system. The bacteriologists claim the necessary agency of specific, pathogenic bacteria, and this idea of specificity carries with it that of meeting with suitable media, such as are found in luxuriance within the genital tract during the puerperal period. The new chemical theory does not invalidate, indeed rather tends to confirm this claim of the vitalists, as well as to give additional force to their assumption, as a future and near possibility, of a more distinct and numerous classification which will explain the occurrence of the definite phenomena presented by puerperal septicæmia.

The argument is always made that, if these favorable maternal conditions are commonly present during and after childbirth, and the bacteria are universally at hand, ready to

work their mischief, how does it happen that most women exhibit no symptoms of a septic process? We must admit, in reply to this, that they are protected by the conservative laws of nature under which, in these instances, there are wanting, in the patients or their surroundings, certain factors which are necessary for the development of the septic phenomena, just as many individuals, after obvious adequate exposures, are not affected with various acute diseases.

But is it the fact that puerperal septic disease is so rare as it is commonly asserted to be by physicians generally, and even by writers of authority? Physicians frequently refer to a large personal obstetric experience, where no antiseptic precautions have been taken, and yet they report a very small mortality and a trifling percentage of, or no, septicæmic cases, even when, as a rule even, the surroundings of their patients would seem to have been such as to favor the occurrence of the affection. In this connection we must bear in mind that evidence, derived from such general statements, is encumbered with a large element of doubt as to its value; that the experience of many, indeed of most of these individuals, extends back into years when the nature of septicæmia was imperfectly understood, and, further, a general statement of experience, covering many years and not confirmed by a definite reference to recorded details, is always open to question as to its accuracy.

Nor is it possible to obtain a reliable estimate of the mortality from septic disease among lying-in women, even from the published registration reports, the deductions which may be made from the mortality statistics furnishing a very inadequate idea of the amount of septic disease which prevails everywhere. Still a brief analysis of these will be sufficient to show that there is a quite constant element of this disease in our State. For this purpose we are necessarily restricted to the classification which enumerates these cases under the title, metria or puerperal fever, while it is

obvious that many of the deaths, returned as from septicæmia, peritonitis, childbirth and some other causes, strictly belong to the category which concerns our present subject. But, even from this restricted source of information, it appears that, in the period of five years, 1878 to 1882 inclusive, there occurred 86,694 deaths of females, *of all ages*, of which number 498, or 1 in 174, were classed as due to metria, and, in the succeeding quinquennial period, 497 deaths occurred from this cause in a total of 95,769 deaths of females, or 1 in 192. In the latest published report of this State, for 1887, only 69 deaths from metria are recorded, a less number than for many years. In the same year there were 4,361 deaths of females between the ages 15 to 40, which period may be fairly taken as covering the childbearing age. Hence of this class one death in every 62 was due to metria. If it were possible to correct this proportion by the addition of those cases which were classified under septicæmia, childbirth, etc., but properly should be classed as metria cases, the evidence of the mortality from puerperal septic disease in our State would, I think, astonish most of us, and especially deserve serious attention when we consider that this mortality affects women in the prime of life, whose loss to families and communities is incalculable.

While we learn from the statistics of mortality that the deaths from metria form quite a noticeable feature, the same cause is assigned for death in one of every 507 confinements during the years 1883–1887, inclusive, which does not present such a sombre picture, it is true, but there is a point of great importance in this connection to which allusion is seldom made, namely, that we have no means of ascertaining the number of cases of puerperal fever which survive, with more or less protracted ailments and local affections, which have their origin in the various septic processes and entail prolonged suffering and disability, and, not infrequent-

ly, an ultimate fatal issue. I venture to state that the experience of most, if not of all, of you, will furnish records of a large number of such chronic invalids who have become serious burdens to themselves, their families and the communities in which they reside.

With our present knowledge, it is impossible to demonstrate the fact, but the weight of scientific evidence tends to show that, while there are some local affections, incident to the puerperal period, which may be regarded as aseptic, most of them clearly have a bacterial origin, and it is an accepted fact that a very large proportion of the pelvic affections, of women who have borne children, which gynæcologists are called upon to treat, have their origin in these localized diseases of bacterial origin.

It is asserted commonly that prophylaxis of puerperal septicæmia is a subject which concerns lying-in hospitals chiefly, if not solely. It cannot be denied that the disease formerly was the bane of these institutions, but the gradual increase in knowledge with regard to its origin has been attended by a continued improvement in their mortality and clinical records, so that to-day it may safely be stated that, in maternities throughout the civilized world where aseptic midwifery is in vogue, septic disease has become a rarity. The experience in the Boston Lying-in Hospital, with which I have the honor to be connected, furnishes a very striking illustration of the truth of this statement, as has been conclusively shown in the paper, presented to the Obstetrical Society of Boston and published in the Boston Medical and Surgical Journal for January, 1887, by my colleague, Dr. Richardson. In this paper is given a resumé of the mortality from septicæmia in the hospital, from the time of its opening in 1873, and instructive charts are exhibited which indicate the gradual disappearance of septicæmia and of "febrile temperatures" (and to this latter point I would direct your attention as being one of the utmost significance)

in quite direct conjunction with the approach to our present practice of avoiding the occurrence of the disease by the most strict adherence to rigid rules which are regarded as efficient in preventing the entrance of active bacteria into the parturient canal, and in sterilizing those which may unavoidably gain access to these cavities. And it should be added, that these results have been obtained without any material change in the buildings or their surroundings, or in the class of patients, while these have increased in number from year to year.

The registration reports, too, disclose the fact that the deaths from metria occur mostly outside of Boston, and, therefore, contradict the assertion that septicæmia is an affection peculiar to hospitals. General medical experience in gynæcology, also, which, as I have already stated, is largely connected with affections of bacterial origin, serves to give a very practical value to the consideration of aseptic obstetries as applied to private practice.

To recapitulate, I have endeavored to show that puerperal septic disease is scientifically demonstrated to have a bacterial origin, and it is immaterial, for our present purpose, whether we accept the chemical or the vital theory of their action; that it is probable that most of the local affections incident to the puerperium belong to the same septic class of diseases; that these occur throughout the State, in both rural and urban districts, more commonly than physicians have been willing to admit, and, this being true, it may readily be understood that deaths from this cause, and the much more numerous cases which survive, to become more or less chronic invalids, entail a serious burden upon the welfare and prosperity of families and the State; finally that the experience in hospitals exhibits the adequacy of due prophylaxis to prevent septic disease.

Our duty, therefore, as obstetricians, ought to be obvious. We are under obligation to add our contribution to the con-

stantly widening province of preventive medicine, by applying to the lying-in period the lessons derived from the bacteriologists.

It does not come within the scope of this paper to discuss the treatment of puerperal septicæmia, but I have merely to present the theory of its origin and the means and methods of preventing its occurrence.

The paper by Dr. Richardson, to which I have alluded, concludes with what may be regarded as an axiom. He says "the experience of those who have investigated this subject and practically tested the method of treatment has demonstrated that *absolute asepsis means absolute freedom from puerperal septicæmia, and that the occurrence of puerperal septicæmia means the absence of absolute asepsis.*" Subscribing fully to this statement, it remains for me to present for your consideration some general plan for accomplishing an adequate asepsis of the lying-in woman, premising that, while we must regard puerperal septicæmia as a preventable disease, as a general statement, our present knowledge and usual means of information are insufficient to warrant the assertion that it can, as yet, be eradicated altogether, for we may well understand, and experience in hospitals teaches, that cases will occur, in spite of the exercise of every known precaution, from sources which it is impossible to detect and against which consequently we are unable to provide.

Prophylaxis, to some extent, against this disease has been employed for a long time, more particularly since Peu, in the middle of the 17th century, made known the fact that its prevalence in hospitals was occasioned by the foulness of the atmosphere in the wards. Shortly after this, Thomas Welles elaborated the idea of fermentation, as applicable to zymotic diseases in general, and formulated rules for the protection of individuals, but attention of this nature was directed to hospitals largely, and, from that time till a very

recent period, little has been advised for patients confined outside of hospitals, except the simple, routine rules which apply to labor in general. But from the ideas as to the origin of the disease, which prevailed so many years ago, has developed the true principle of antisepsis, which, however, was applied, with a mere approach to perfection, to the disease after it had invaded the system, yet, at the same time, there were established, out of this principle, rules of prophylaxis which, if carried into private practice, would have accomplished a great deal in the way of prevention of puerperal disease. But the error prevailed then, as ever since, that the necessity for such procedures is furnished only in hospitals, notwithstanding the fact that isolated cases, and, indeed, epidemics have always occurred and been commented upon.

In those remote days, the endeavor was made to provide for adequate ventilation, to furnish, as far as possible for the time, an adequate and suitable temperature; to insure cleanliness of the patient and her surroundings; to avoid unnecessary vaginal examinations and interference with the normal process of labor. Vaginal and even intra-uterine injections of water, soothing liquids and disinfecting solutions, were employed, in appropriate cases, to promote the escape of decomposing blood clots and remains of the placenta and membranes.

While, however, the rules which were adopted were correct in principle, they were necessarily defective in their application, owing to the lack of knowledge as to the precise details required to ward off the disease and to their comparatively restricted resources.

A great advance was made, under the guidance of the ideas of Semmelweis, towards a more thorough asepsis of the patient, but it was not until very recent years that the true doctrine of absolute asepsis was established upon the basis of the germ theory, and, whether we accept the chemical or the vital interpretation of the phenomena,

whether we subcribe to the belief in the autogenetic or in the heterogenetic forms of the disease, the central idea prevails that specific germs are the efficient agents, and that these are to be kept out of the utero-vaginal canal, so far as this is possible, and that those which enter are to be destroyed or rendered inactive; and, in conclusion, I invite your attention to a brief statement of what may now be regarded as necessary in the way of prophylaxis in private practice.

Filth implies decomposition and invites the presence of septic germs. Hence we are called upon to promote cleanliness, in every manner and in all directions, regarding the patient herself and her surroundings. Her body and especially her genitals should be made and kept clean, throughout the labor and subsequently. The soiled personal and bed clothing should be changed as soon as possible, and at once taken from the chamber. All utensils and instruments should be kept scrupulously clean, disinfectants being employed for everything that is brought into contact with the genitals. Proper contraction of the uterus should always be promoted by manipulation, by ergot and other means. It is important, too, by means of compresses, or in other ways, to secure such a position of the uterus that there will be no obstruction to the exit of the lochial discharge, and, in this connection, it may not be out of place to remind you that the emptying of the bladder should be secured at proper intervals, and that defecation usually requires attention on the third day. At the onset of labor, an enema is required for various reasons. The vulva should frequently be bathed, preferably by a wad of absorbent cotton or charpie which has been soaked in a disinfecting or antiseptic solution. After a tedious or laborious labor, or when artificial or instrumental delivery has been necessary, it is important to give a vaginal douche of a hot disinfecting fluid, which should be extended within the uterus if its cavity has been entered

by the hand or by instruments, and, also, if a putrid child has been born. While it may not be required in all cases, I believe a hot vaginal douche promotes contraction of the uterine and vaginal tissues, empties the cavities of the clots which may have accumulated and affords comfort to the patient. Perineal lacerations should be united, in order to avoid the exposure of extensive raw surfaces to the action of the germs. After the completion of the labor and while the physician's attention is directed to other matters, a napkin or towel, wet with the disinfecting fluid, should be placed against the vulva. Finally the toilet of the patient is to be made complete, all soiled clothing removed, and the vulvar napkin applied.

In the hospital, following nearly the method of Garrigues, we employ a specially prepared antiseptic pad, which is fully described in Dr. Richardson's paper. As a matter of fact, it is quickly and easily made, is inexpensive, and, we believe, it is an efficient protective, but probably for general use other pads may be equally serviceable, and I frequently use one composed of a layer of borated or sublimated cotton, enclosed in cheese cloth or any similar material. These are changed frequently, and, of course, destroyed. Whenever the vulva and adjacent parts are exposed for any purpose, they are to be thoroughly cleansed with the disinfectant.

The same rigid rules as to cleanliness and disinfection must be enforced upon the nurse, who should be required to be tidy in her person and attire, preferably, of course, dressed throughout with materials which may be washed. She should keep her hands and finger-nails scrupulously clean, and should be instructed never to touch the patient's genitals without first having dipped the hand into the disinfectant and always to exercise extreme care with regard to all utensils and instruments which she may have to use with the patient. Especial precautions devolve upon her if she has just come from attendance upon a patient with zymotic or contagious disease.

The physician, too, should be governed by the same rigid rules with regard to absolute personal cleanliness and disinfection of the hands, in digital examinations and all operative procedures. If he has been in recent attendance upon acute, infectious or contagious disease, or in immediate contact with decomposing, cadaveric material, he is bound to exercise the utmost precautions, especially in avoiding the conveyance of germs to the genital tract, by the most careful attention to the hands and finger-nails.

Properly these rules are to be observed throughout the lying-in period, but especially are they required during the first week; and, in all cases, while providing for proper ventilation of the chamber, it is required, as a matter of prime importance, that sewer gas should be excluded absolutely from the chamber. Whether this is deleterious because it is pervaded with bacteria which are related to septicæmia, or whether, in some way, its inhalation makes the patient more susceptible to the action of the germs, are points which have not been determined.

It is claimed by many that an efficient prophylaxis may be attained by more simple methods; that pure water and the ordinary measures for promoting cleanliness are sufficient to render the patient aseptic. Surely this is not true of our hospital, where, as I have already stated, the gradual improvement kept pace with the approach to our present mode of treatment, and many of us have good reasons for knowing that septic cases occur not infrequently in private practice where such simple measures only have been employed.

With regard to the best disinfectant to be used, all experience tends to emphasize the value of corrosive sublimate in solution for general use. It is inexpensive and easily carried about in the form of tablets. Owing to its corrosive action upon metals, carbolic acid or other agents need to be employed to disinfect instruments and metallic utensils. Iodoform is a valuable agent for many

purposes, but its persistent odor forms a serious objection to its continued use, especially externally. For anointing the fingers and filling the spaces beneath the finger nails, carbolated vaseline is suitable, though in the hospital we use a cerate containing eucalyptus oil. For douches, the bichloride solution offers at least one great advantage, in that it has been shown that very weak solutions sterilize the germs, and that a prolonged contact is not required. Cases of serious symptoms from mercurial poisoning have been reported, when employed in the treatment of septicæmia, but it is more than probable that, in all these instances, either the solution used has been too concentrated or the contact with denuded surfaces has been too much prolonged, or else due care has not been taken to provide for the immediate escape of the injected fluid. Possibly, too, in some instances, the individuals have had an unusual susceptibility to its action. For my own experience, both in hospital and private practice, I have never had occasion to regret its use, and I do not recall an instance in the practice of others where its employment *in prophylaxis* has been the cause of any injurious effect.

It is probable that other antiseptics,—and very many have been recommended,—may be equally effective in producing asepsis, at least in private practice; but the sublimate solution appears, on the whole, to be the best. At all events, the principle remains whatever agent may be employed.

I have already alluded and replied to the objection, made by many physicians, that the routine methods herewith described are quite unnecessary, outside of hospitals. To those of you who have taken this ground, permit me to say that the requirements of adequate aseptic midwifery add but little to your duties or to those of the nurse. There is nothing complex about the rules, to understand and apply which calls only for ordinary intelligence, and

this, at least, any one should possess who ventures to assume the responsibilities incident to presiding at the birth of human beings.

DISCUSSION.

Dr. F. E. Porter, of Auburndale:—Many of the diseases which have attended and surrounded the parturient stage are now being classed as infectious, and fall into the line of treatment so well marked out and known as antiseptic.

By the use of antiseptics in obstetrics the mortality has been reduced to less than one per cent. Some one has said that a woman about to be confined was safer in a good lying-in hospital than at her own house.

In order that I might bring something practical before you to-day, I sent to the various physicians of Newton the following questions: 1. Do you use antiseptics in obstetrics? 2. The kind? 3. In the use of antiseptics in obstetrics what plan did you adopt? 4. Since adopting the plan have you seen less of sepsis. (By sepsis I meant septicæmia, peritonitis, phelebitis, perimetritis, or any other infectious complication or condition.)

I received returns from twenty-seven out of twenty-nine physicians. The number using antiseptics was eighteen. The number using some regular plan in obstetrical work, Dr. Garrigues' or Dr. Richardson's, or one of their own, giving special attention to cleanliness as regards their own person, instruments, nurses, connection with other infectious disorders, free use of hot water, etc., twenty-two. Not mentioned, five. Number having seen less of sepsis since adopting the plan, two. Seventeen testified to not having had sepsis in their practice. Three testified to having seen one or not more than four cases altogether in private practice; and five omitted to answer the question. Here it should be said that several began the practice of medicine since the antiseptic treatment has been known and taught in the schools. Of course they practised as taught, and knew nothing about the pre-antiseptic era. Then again it should be mentioned that others adopted it

from statistics of lying-in hospitals, and others from reading and perhaps from the possible bitter experience of some one case.

I would like to draw two inferences from the above remarks, and from the evidence of skilled nurses:

1. That the discussion of antiseptics in obstetrics has increased the attention to cleanliness if not to the direct use of antiseptics in parturition.

2. That it is likely to become in the near future the exception for obstetric cases not to be treated antiseptically.

DR. S. M. CRAWFORD, of Roxbury:—When we think of the number of generations that have existed before antiseptics or germicides were thought of, we might suppose, judging from the theories of many of the modern practitioners, that the face of the globe ought to be barren today of human life. From the past ten or twelve years' experience both in private and hospital practice, I heartily endorse antisepsis.

But learning more of the germ-destroying properties of the various chemicals when employed in certain conditions, I am sure that simple immersion of these germs in these solutions is not certain death to pathogenic micrococci; therefore we cannot safely pin our faith to any one of the reputed germicides, or trust to them except as accessories to the one grand and certain safeguard—perfect cleanliness of every thing about the person of our patient, particularly of instruments and the hands and clothing of those who use them.

I would speak in favor of one agent which is easily obtained, and whose application is always safe and certain when properly used, and that is boiling water, or its equivalent, steam.

In cleansing hollow instruments, as catheters and tubes, much care must be taken that the instruments are completely filled with the boiling water so as to prevent the escape of any germs behind a barrier of compressed air.

Many of our most valuable agents to successful antiseptic treatment are rendered useless or harmful in the hands of the ignorant or unskilled. There are so many details upon which immunity from danger depends, that it may well be

doubted if the comparatively simple operation of washing out the uterus can be left to any except the skilled obstetrician. No one can deny that there are many different causes of high temperature in the puerperal woman; under these circumstances have we any right to imperil our patient by resorting to such a procedure until we have absolutely proved that there is present in our patient that which needs washing out?

Dr. E. M. Buckingham, of Boston:—We all believe in the efficacy of thorough aseptic treatment for hospitals, and if we accept the statement of facts made to-day we must also accept the need and efficacy of aseptic treatment in private practice.

Recognizing fully that the temperature may be raised by constipation, by hysteria, and by other causes, and that you may get tenderness on abdominal pressure at any time if you press hard enough, and that this tenderness gradually disappears without any rise in temperature, that it does not necessarily mean sepsis, yet, notwithstanding that, I have seen certain mild cases of septic poisoning in my own practice, previous to adopting a modification of the method of treatment by Dr. Richardson. An objection I have made to anointing the hand with carbolized vaseline is that it is adherent, hard to get off the instruments and hands, and in the many examinations necessary it is extremely probable that mixing with the discharges of the patient and not being entirely washed from the hands, it becomes infective between the examinations. I have been better satisfied by adopting Dr. Richardson's plan, and using the oil of eucalyptus and vaseline; not so much because the oil of eucalyptus is very antiseptic, but because, while it adheres to the hands, it is possible to wash it off.

Carbolic acid in any strength possible to inject into the vagina is not an antiseptic to be relied on. Water from the Cochituate pipes is septic. I believe that the use of moderately carbolized injections of such water as we are likely to get in most places that has not been boiled, is far more dangerous than to let the patient absolutely alone during the lying-in period.

In attempting to make the treatment positively aseptic, the toilette of the hands is perhaps the most important part;

and my practice has been to wash the hands with soap and water previous to the first examination and immediately after. The finger is wet with corrosive sublimate before passing it into the vagina.

The aseptic treatment is a thing to be learned by practice, as the soldier learns his drill.

The antiseptic pads are unquestionably efficient. If any body objects to them it is easy to take a napkin and dip in corrosive sublimate solution and dry it.

The only objection which I have personally seen to carrying out a thoroughly aseptic treatment is in the use of the catheter. I think I have once or twice seen a little irritation in the urethra from the passage of a catheter which had been wet with too strong corrosive sublimate solution.

Dr. O. H. Everett, of Worcester:—My practice is, as far as I can make it so, aseptic; while I thoroughly believe in it I have not adopted it to the extent which many have spoken of here to-day. So far as perfect cleanliness is concerned, I believe in it thoroughly, in the fullest extent. My method is to insist that every thing be kept perfectly aseptic. Thus far this has been satisfactory in my own cases.

Dr. C. W. Stevens, of Charlestown:—It has been claimed that it is not possible to carry out the antiseptic treatment among the very poor; that they are filthy, with filthy surroundings and unable to have necessary appliances. My reply to that is that I myself carry out fully this antiseptic practice in a modified form among these classes.

My usual way is first to give a soap and water enema, and then having washed my hands in 1 to 1000 corrosive sublimate solution, I make as few examinations as possible and give no douche prior to the confinement. If instruments are necessary, I use little tablets of hydro-naphthol. I never use stronger than 1 to 4000 corrosive sublimate and 1 to 1000 hydro-naphthol. If there is any lesion of the perineum, I use cat-gut for the simple reason that it will retain its strength long enough in the tissues for a primary union, and I have found silk unnecessary. After the labor I invariably give a spray of 1 to 4000 of corrosive sublimate. I spray the parts well, and if I

have taken any stitches I put on some iodoform or iodal collodion and wash the outside; I give no douche until after confinement, and that is 1 to 4000 corrosive sublimate. For several days afterward, if there has been any lesion, I still spray the vagina and use an insufflator with iodal to insufflate the inside of the vagina and the vulva. I make about 1 to 4000 solution of bichloride, in which I require the napkins to be dipped. My patients on the whole say they prefer them to dry napkins. I have them wrung as dry as possible; they cling better to the part, absorb better, and afford more comfort. As long as the solution for the napkins is of no expense to them,—and hardly any to myself,—these napkins are employed regularly, and in some few cases where I have had septicæmia with considerable doubt about the purity of the air, etc., I have taken iodine and put it in saucers with a little alcohol, the vapors of which have been beneficial it seemed; so that the iodine vapors I have considered the best antiseptic for the air of the room. Formerly I used bromine, but that was too harsh.

Dr. Z. B. Adams, of Framingham:—Years ago some unfortunate cases in my practice followed directly upon the use of the vaginal douche in the hands of experienced, trained nurses hired from Boston.

I reported these cases and my unfavorable opinions drawn therefrom before the Obstetrical Section of the Suffolk District Society. Concerning the use of the douche in normal midwifery, I still believe, as I did then, that it is bacteriology run mad; and what has been said to-day convinces me that that is the correct view to take of it.

It has its dangers. One gentleman spoke of the danger in injecting Cochituate water which contains germs, and the germicide, whether carbolic acid or bichloride, is not strong enough to kill these germs. There are unquestionably dangers in the use of the douche. When should it be used, and when not? The line I drew at that time I still draw,—only when you have foul lochia. Dr. Richardson has pointed out the danger in the use of the bichloride solution, citing some cases where he had had bad results from its use. It is dangerous if used too weak (true also of carbolic acid). Weak solutions of carbolic acid may produce

a smoky urine, whereas strong solutions could be applied without risk; and I think I have seen cases where the mild solutions of bichloride have caused poisoning that would not have been produced by strong solutions.

An attempt was made to show that danger lay in the kind of syringe used. Some never allowed the fountain syringe to be used for the reason that a head of water was something you could not control, therefore the use of the bulb syringe was advocated; others could not trust the hand of the nurse, and always used the fountain syringe. The trouble is not with the syringe, but with the method employed.

I have nothing to say against the system, against the germ theory of disease, the necessity of keeping out the germs of puerperal fever. It is a thing admitted, known ever since Dr. Holmes's paper in 1836 or thereabouts. The germ origin of puerperal fever is nothing new. But this system for destroying germs, for trying to treat these organisms which you can't reach or see in this way, this is new, and seems to me a kind of madness.

Dr. E. F. Dunbar, of Roxbury:—I am an advocate of aseptic midwifery; whether antiseptic is another question. I do not give douches in or after a normal case of midwifery. In complicated cases I use douches of corrosive sublimate 1 to 2000, followed by injections of hydronaphthol to wash out any superfluous corrosive sublimate.

Cleanliness has to be governed somewhat by the family of the patient, but I insist that doctor, nurse and clothing, etc., shall be as clean as possible. Before I examine a woman I wash my hands and arms thoroughly with corrosive sublimate 1 to 1000, and particularly attend to the finger-nails. Then I use carbolized vaseline or carbolated glycerine, and make my examination. If the case is simple and uncomplicated, the woman never gets a douche.

I don't sew up the lacerations if the fourchette only is torn, as it is nineteen out of twenty times in my experience. But if the perineal body is torn to any extent I sew it up, using cat-gut, and finally sprinkle on a little iodoform.

Dr. H. E. Marion, of Brighton:—I desire to place myself decidedly on the side of asepsis.

With reference to giving a douche before labor, one thing has not been mentioned. It is my custom to give a bichloride douche before labor in all cases where there has been a leucorrhœa during the last month or two of gestation, not particularly for the mother, but for the child; and in so doing I feel sure that there is less of ophthalmia of the newborn, the gonorrhœal ophthalmia of infancy.

One form of laceration has not been spoken of here, that is the linear laceration of the vagina, running parallel to the axis of the vagina, dividing the levator ani muscle, which is a cause of many subinvoluted vaginæ, and the repair of which gave Dr. Emmet new laurels. Several times I have found this linear laceration of the vagina and no laceration of the perineum. You will find by passing the finger well into the vagina and sweeping it around a fissure, which on examination proves to be a deep laceration, and if detected at the time and repaired by the rules laid down by Dr. Emmet, will save a great deal of suffering to the patient, and a very tedious operation later.

Dr. J. F. Couch, of Somerville:—My brother and I place ourselves on the side of asepsis in conducting our obstetric practice, and more particularly so amongst the poorer classes.

Ophthalmia neonatorum, our experience teaches, is not often found among these people.

We do not use douches before or after labor, unless there is necessity, evidenced by some rise in the temperature or by some peculiar condition of the patient; otherwise we let the patients severely alone. On our hands we use bichloride, and hydro-naphthol on the instruments.

Dr. J. S. Greene, of Dorchester:—Since I have adopted aseptic methods, during the last three or four years, I am better satisfied. I have now less anxiety in approaching cases of midwifery than before the era of asepsis. I have not found any particular difficulty in applying what I regard the essentials of aseptic midwifery, somewhat modified according to the class of patients. My freedom from anxiety has been constant, with a single exception.

This exception consisted of two consecutive cases of aseptic midwifery. The first was a case of septicæmia of

unknown origin of most violent character, resulting fatally in about three days, and attended by premature delivery. The next case was conducted aseptically. Thirty-six hours after natural delivery there struck up a sharp attack of septic fever. This puzzled me and gave me some anxiety, for I had to ask myself: Have I got to revise my views on the application of antiseptics? I found no flaw in my proceedings from first to last, according to my views as to the application of the principles. Nevertheless here was distinctly a sharp attack of septicæmia. Within four or five days two other members of the family succumbed to severe attacks of fever,—one with chills and headache which was transient; another the nurse, whom, by the way, I had engaged and found she had not been present at any case of sickness for some time, developed a sharp attack of erysipelas. The septic trouble of my patient lasted about ten days, during which she was quite seriously sick. I began uterine douches before I knew how the trouble arose. I continued them after I had discovered it. I found that the sink drain was filtering through a very few feet of earth into the cellar, and into the well within ten feet. I believe that the intra-uterine douches I used, although not for offensive lochia, were nevertheless rational and useful. They were acceptable to the patient, and although not lowering perceptibly the temperature at the time, yet they contributed to the comfort and conscious well-being of the patient, and I think hastened her convalescence.

Dr. C. M. Green, of Boston:—When are douches to be used, and when not? The custom in the hospital now is to give a vaginal douche in the beginning, that the woman may start with a clean vagina, not solely for the benefit of the woman but also for the benefit of the child. If it does not do harm to give a vaginal douche as far as the mother is concerned, and does take away the risk of ophthalmia, it seems to me well worth doing. In private practice, if there is no leucorrhœa and if the woman is clean I do not feel that it is absolutely necessary, and do not invariably do it; nor do I uniformly give it at the conclusion of labor if the labor has been normal, no instruments have been used and examinations have been few. In that case I feel if my hands have been perfectly clean and no germs introduced,

there are no germs to be killed; consequently I do not consider that I am at all negligent of duty if I do not douche that woman at the conclusion of labor. If the forceps have been used or the hand introduced into the vagina to extract the placenta, then, although I think my hand may have been clean, I give the douche.

Is the douche dangerous? In incompetent hands I think it is. I once had an accident myself. But still, because one woman may have had a uterine colic I should not abstain on that account from giving the douche if I thought it useful in the majority of cases.

The matter of ophthalmia I think is a very important one, and especially with those who practise largely among the lower classes, laboring people; not that that class is any more susceptible to gonorrhœa than any other, but it seems to me they are less clean in their personal habits and need the preliminary douche more than the higher classes. A word has been said about following out the aseptic method among the poor, that they cannot do it because it is expensive, or something of that sort. Aseptic midwifery may be carried out entirely and perfectly among the poor as well as among the rich. In support of this statement I would say that in the Clinic of the Harvard Medical School the students deliver in this city in the year about five hundred cases, and we don't have septicæmia, or women sick with septic fever; for it is not a question whether they are going to die with it, but whether they are going to be sick. These women live, as we all know, in very unhygienic quarters, do not have clean sheets, do not have pads, lucky if they have the ordinary towels,—many do not have them,—and we don't have septicæmia, and why? Because the students are taught to take care of their hands, and that, I beg leave to state, is a very important thing. If the man's hands are clean, I don't care for the douche or pads or anything else, in the long run.

How are the hands to be cared for? Wash them in soap, and scrub, using yellow bar soap, and a nail brush with good bristles, carefully scrubbing the hands and the arm to the elbow in soap-suds; then the nails need to be cleaned carefully and thoroughly; finally thoroughly scrub the hands in the corrosive sublimate solution and use the emol-

lient. If the hands are cleaned in this way, one is not going to have septicæmia, septic fever, or any of the septic troubles.

Regarding instruments, I am sceptical whether 1 to 20 carbolic makes them aseptic. I question whether it is not our duty every time our forceps have been used to boil them.

Many of the poor have no napkins; certainly no pads. If they have the napkins it is as well to dip them in corrosive sublimate and apply them as to buy pads which cost 75 cents a dozen. The pad is a luxury; convenient, because it can be burned up; but the common menstrual towel soaked in corrosive sublimate and dried or not will answer. I have had them dried because afraid of causing irritation from wet corrosive sublimate. They can certainly be used because of no expense to the patient. Corrosive tablets cost only a cent each at retail, and a few make enough solution to disinfect all the towels the woman wants through her sickness.

DR. F. E. PORTER, of Auburndale:—At the opening of the discussion there was one item I wanted to bring out that I have not heard mentioned. We speak of "asepsis" and "antisepsis," of "infection" and "disinfection." The definition of "disinfectant" is "an agent that kills germs," and, as I understand it, an antiseptic doesn't. A recent report on the subject says that if our disinfectant be corrosive sublimate, in order to kill germs or spores we should use 1 to 500 for a certain period of time; if germs without spores, 1 to 2000. None of us would think of using a douche of the strength 1 to 500; and if we don't use it of that strength what authority have we that we are killing germs, if the disease is from the germs?

ARTICLE XXII.

THE SURGICAL TREATMENT OF BACKWARD DISPLACEMENTS OF THE UTERUS.

By CHARLES P. STRONG, M.D.
OF BOSTON.

READ JUNE 11, 1889.

THE OPERATIVE TREATMENT OF BACKWARD DISPLACEMENTS OF THE UTERUS AND ITS RESULTS.

During the period of the last four years various surgical measures have been proposed for the relief of that condition of the uterus which is so commonly encountered and so often unsuccessfully treated. To those operations which have been performed with sufficient frequency to entitle them to presentation, I invite your attention.

There are two points which I wish to emphasize at the beginning of this paper. First, it is not intended to discuss the question whether backward displacements of the uterus form, *per se*, lesions directly or indirectly responsible for certain symptoms, and, as such, demand treatment, nor the pathological changes which cause these conditions. Secondly, it is assumed that all practicable non-surgical measures, packing, pessaries, etc., have been previously employed and failed. To obtain a fair estimate of the relative frequency of these lesions, I have examined the records of the last six hundred cases of pelvic disease that have been treated at my clinic at the Free Hospital for Women, selecting those records rather than those of my private practice, because the diagnosis is there recorded of the condition which is considered to be the cause of the patient's symptoms, and does not also embrace a multitude of minor details. There are recorded in these six hundred cases, 78 cases of retroflexion and 75 cases of retroversion,—that is, 25 per cent. of the cases applying for relief have symp-

toms which I considered due to backward displacement of the uterus.

At the outset two distinct divisions of this displacement must be made. First, backward displacements which are not adherent. Second, backward displacements in which there exists union by slight or by firm adhesions between the uterus and adjacent viscera or pelvic walls. The treatment of the two classes by surgical measures demands separate consideration. In the former it is limited to the best means to be adopted for retaining in its normal position the uterus which can be replaced manually; in the latter, the additional consideration of how first the uterus may be freed from its abnormal position and subsequently secured. It may be well to consider for a moment what these adhesions are and how they originate. Before laparotomies were so common our information upon this point was theoretical. It was considered that inflammation of the parametritic cellular tissue was the effective agent, but the revolution within the past five years in our knowledge of the pathological conditions of inflammatory changes in the pelvis have demonstrated the incorrectness of this view, except in rare cases; and it is commonly accepted that the adhesions become organized from the peritoneal exudations caused by tubal disease or direct peritoneal inflammation from disease of the uterine mucous membrane. Rarely they may arise from simple tubercular peritoneal inflammation. If it were possible to make sure that all adherent uteri had diseased tubes accompanying them, the problem of interference would be much simplified; but the salpingitis may long ago have disappeared or even never existed, so that every case must be carefully considered in this regard. In simple retroversion these adhesions usually bind the investing peritoneal membranes of the posterior uterine and anterior rectal walls in close contact. Long string-like adhesions in this site are rare. Laterally, one or both broad ligaments may be

deflected backwards and united, but less closely, to the lateral wall of the uterus. Occasionally slender filamentary adhesions run from the posterior pelvic wall to various points upon the fundus. In retroflexion the adhesions between the rectum and uterus exist usually more completely around the tip of the fundus, as the uterus is doubled over upon itself, and stronger adhesions exist between the sacrum and the anterior part of the fundus. Adhesions may exist from the slightest degree to those which render the uterus permanently immovable.

Before passing to the consideration of the various methods best adapted for replacing the backward displaced uterus and securing it permanently forward, the measures to be employed for the separation of adhesions only may be well considered.

The simplest plan that would present itself surgically is rupture or tearing off the adhesions without any cutting operation. Unquestionably this has been performed many times in an accidental manner as it were, by every gynæcologist, but Schultze has so formulated a method of procedure and has been so far the boldest in his attempts that the operation of forcibly replacing the adherent uterus bears his name. The method, as I have employed it, does not essentially vary from that described by him, although I had practised it empirically before reading his article upon the subject. The bladder and rectum must be thoroughly emptied and complete surgical anæsthesia induced. I employed the right hand for manipulation through the abdominal walls, and, conjoined with vaginal or rectal examination by the left hand, mapped out very carefully the size, extent, and resistance of the adhesions and their relation to the other pelvic tissue viscera. The importance of this preliminary examination and its thorough performance cannot be too strongly urged, as on the result depends the prognosis of further procedures. If the case is deemed

operable, two fingers in the rectum are used to dislodge the uterus from its position beneath the promontory of the sacrum, prying it first to one side, then to the other. Usually it is more easily elevated by passing to the left of the promontory. The hand upon the abdomen meanwhile makes firm, deep pressure, endeavoring to press the finger tips behind and beneath the fundus and so bring it forward. A stroking motion of the hand towards the pubes aids materially. As the fundus is raised the adhesions are brought into clear prominence, and if small and slender, are snapped off. If large, more organized, flat, and connected with the rectum, or the peritoneum of the pelvic wall, an attempt is to be made to separate them at their uterine end by peeling them away. As the uterus is raised, and the fundus anteverted by the hand on the abdominal walls, adhesions are discovered which may not have been previously suspected, and which must be dealt with in a similar manner. When once the fundus is elevated beyond the promontory of the sacrum, the grasp of the hand through the abdominal walls operates as a powerful agent by which it is still further anteverted, and the other hand may perhaps best operate in the vagina instead of the rectum, pressing the cervix backward. During the process of replacement it is often necessary to employ both hands upon an adhesion, either for examination or the requisite manipulation for its detachment. As the uterus, if thus left unsupported, would fall backwards, I introduce a flexible sound of which the uterine extremity can be bent to any angle by curving the outside portion, an assistant by this instrument can hold the uterus exactly in the proper position without injury to its lining membrane. I never introduce an ordinary sound, which it is impossible to employ without some leverage action. It is not always possible to fully complete the operation by entire separation of the uterus, but satisfactory therapeutic results, even under these conditions, may be obtained, as one of my cases will illustrate.

When once the uterus is brought forward, the problem presented is as to the best method of retaining it in its new position. For this purpose artificial measures of some kind must be employed immediately, or it will fall backward again and adhesions at once re-form which may not be so amenable to treatment. I have not found it necessary to employ other measures than a suitably adjusted pessary and packing, except in two cases. I keep the patient very quiet for a week, watching carefully for any signs of peritonitis. Thus far, in more than twenty cases in which I have operated, there has been but one which was followed by any inflammatory reaction; and in this instance I was unable to keep the patient quiet more than one day. A long carriage and railroad ride followed within twenty-four hours after the operation, and the result was a sharp peritonitis and decided re-forming of adhesions. So far as I have been able to trace the patients, two only have required further surgical treatment for a recurrent displacement. One of these I twice operated upon by this method and subsequently by laparotomy. There being no decided variation in the method employed it would be wasteful of time to enumerate all these cases in detail.

Case I.—A typical, uncomplicated, successful case. B. M., 20 years of age, a working girl of fair physique but anæmic. Very acute retroflection with strong adhesions extending from the fundus to the posterior part of the pelvis. Laterally the pelvis was free. Dysmenorrhœa, debility, and gastric disturbances were the symptoms demanding relief. Operation June, 1887. A retroflexion pessary was inserted. The patient was last seen in May, 1889, perfectly well. The uterus still held in position by the pessary. An attempt to leave it unsupported a year subsequent to the operation was followed by a tendency towards retroversion. There are no evidences now to be found of the previous existence of adhesions.

CASE II.—Relief of the symptoms, incomplete restoration of the uterus to its normal position. E. F., 24. Enlarged, retroflexed, adherent uterus. Decided endometritis. Present complaints,—sterility accompanying marriage of four years, nervous and circulatory disturbances. The patient was weak and sickly, with poor family history. Several attacks of peritonitis within the previous seven years. I employed all ordinary measures to relieve the uterus from its adhesions unsuccessfully. May 10, 1888, the uterus was forcibly separated and brought forward until the fundus was freely movable above the sacral promontory. All the adhesions posteriorly and on the left side were freed; on the right a strong inflexible band, the size of the thumb, evidently connected with the broad ligament and possibly involving the tube, prevented complete reposition. The pessary, inserted immediately after the operation, retained all the advantages gained. Without further local treatment the endometritis subsided, the general symptoms disappeared, and in November, about four months subsequent to the operation, the patient became pregnant. As the sterility was the symptom for which the patient most decidedly wished relief, I considered the operation therapeutically successful. It is interesting to find that at the fourth month of pregnancy this adhesion was stretching and allowing the fundus to rise, but deflecting it strongly to the right. However, pregnancy has progressed favorably.

LIMITATIONS OF THIS OPERATION.

It is unwise to attempt a forcible reposition if there is present any acute inflammatory process. If the adhesions connect the fundus in broad bands with the investing membranes of the rectum; if the adhesions are found to be lateral, involving, as they probably do in that case, the tubes or ovaries or both; if they have resulted from an attack of general peritonitis; if it is fairly probable that tubal

disease is present; with the operation partially completed, no further attempts at complete reposition should be made if the hand manipulating through the rectum finds the rectal wall is raised as the uterus is elevated. With any of these complications there would follow laceration, or such undue tension upon tubes or intestines as would lead to their rupture or sloughing.

THE TREATMENT OF THE NON-ADHERENT BACKWARD DISPLACEMENT.

The problem here to be solved is to permanently secure the uterus as nearly as possible in its normal anterior position in the safest, surest manner. There have been many devices suggested which have had the test of one or two trials. Unfortunately, most recorded cases have been reported too soon to afford a sure test as to the liability of relapse, so that for our guidance there remain but few recognized methods. These are: 1st, the operation known as shortening of the round ligaments at the inguinal ring, or the Alexander–Adams operation. 2d, direct fixation of the uterus forward, by stitching it to the anterior abdominal wall or to some anterior portion of the pelvic lining. 3d, shortening of the round ligaments within the abdominal cavity without destruction of their continuity. These latter two operations depend for their successful results largely upon the establishment of adhesive inflammation between peritoneal surfaces, the former upon the sustaining power of the round ligaments of the uterus.

The Alexander–Adams Operation. — Since I first performed the operation in August, 1886, I have operated for the cure of backward displacements *alone* eleven times; with three exceptions, I have made examination of these patients within the past month. Two of those have been attended by their family physician, and the third has passed from my observation, but not until

after the results had stood the test of a year, and a year of hard work. Anatomically, every operation has been a success; therapeutically, two have not realized all that was hoped, but as these cases had various complications coëxistent with the displacement, they cannot weigh against a surgical success. I tabulate the cases only in the intervals of time that have elapsed since the performance:

No. of cases in which more than two years have elapsed since the operation,	2
No. of cases in which more than eighteen months have elapsed,	2
No. of cases in which more than fifteen months have elapsed,	3
No. of cases in which more than eight months have elapsed,	2
No. of cases in which more than six months have elapsed,	1
No. of cases in which more than two mouths have elapsed,	1

This table includes no case in which the operation was performed for other causes than those strictly relative to the subject of this paper. The operation of shortening the round ligaments I have performed in practically the same manner in all my cases, a brief description of which may be of some interest; so I will quote from my paper upon this subject (Shortening of the Round Ligaments), published in February, 1888.

To avoid repetition I will give in detail the procedures I have followed in all my cases. I have aimed to make the operation as thoroughly aseptic as a laparotomy. I make an incision directly upon the spine of the pubes and locate the external opening of the inguinal canal, clearing away the edges of the ring, raise the little mass of fat lying just inside, and, separating it by director and knife from the sides of the canal, draw it out until the round fleshy-looking fibre of the round ligament appears, exercising great care not to separate the proximal end of the ligaments from its fastenings. The fullest development of the ligament is not reached until an inch or more is drawn out. I free two or three inches of the ligament in this manner, handling it with great care, and similarly treat the ligament of the

other side. An assistant then lifts the uterus, vaginally, to its proper level and position, and any further slack of the ligaments is drawn out and secured to the pillars of the ring by fine silk sutures.

The surplus mass of the ligaments is then folded upon itself and packed away, forming a plug in the ring, and the external wound closed without drainage. Dry occlusive dressing is applied, which is left undisturbed a week. A support is inserted that will retain the uterus in its proper place and take all strain from the ligaments. The patient is kept quietly in bed for two weeks.

The remote results of this operation having been so favorable, are there any immediate dangers? I have not had one disagreeable symptom until my last three cases, in which there was some suppuration from the use of non-septic cat-gut for the external stitches. In only one case have I failed to find and secure both ligaments. This case is of interest, too, as being one in which forcible breaking up of adhesions, under ether, followed by the use of a pessary, have been successful in converting it from an adherent to a non-adherent uterus, although the uterus flexed backward over the support. A year after the first operation, the adhesions had not re-formed, and at this later operation I found the uterus perfectly moveable. This was one of the cases tabulated as successful after more than eight months. The patient, a girl of seventeen, having the physique of a child of twelve. The ligament first secured was the right, which was, by direct comparison at its largest part, the size of the lead of an ordinary pocket pencil. The ligament on the left side could not be found, although I searched for it over an hour.

Shortening of the Round Ligaments within the Abdominal Cavity.—Dr. Wiley, of New York, in the American Journal of Obstetrics, has described and figured this operation. Never having performed it myself I quote from his

article the main points of his description:—The round ligament is caught with forceps, about midway between the pubic bone and cornu of the uterus. Pulling it up in the abdominal wound the inner side is scraped so that the peritoneal surface is raw. Three silk sutures were passed around the ligament so as to include most of the ligament and bring its folds into close apposition. The ligatures are tied tightly, but not enough so to cut or injure the ligament. The ligatures are not passed deep enough to injure the bladder or ureter. The uterus was supported by a pessary. The first case, performed three years ago, is successful. The uterus is in position without any pessary. Dr. W. states that he has had an opportunity to repeat the operation in several cases with good results.

This method of operating necessitated a preceding laparotomy, and in that regard is less advantageous than the regular "Alexander–Adams Operation." With the abdomen open for some other cause, I think it is certainly warrantable, with the successful result which Dr. Wiley has obtained, to make a fair trial of it.

Fixation of the Uterus to the Anterior Abdominal Wall.—I have considered this under the general heading of "Treatment of the Non-adherent Uterus," for the sake of a more practical comparison of the various methods employed to secure anterior fixation of the uterus, contrasting it thus with the other methods of shortening the round ligaments, or the method to be later described as Schücking's Method of Anterior Fixation of the Uterus. The operation is one which, until the present era of indiscriminate laparotomy, has been performed in but few isolated cases and in an experimental way, and usually associated with removal of tubes or ovaries. During the past twelve months it has sprung rapidly into favor. To me it seems unjustifiable unless its performance be guarded with stricter limitations than any of the surgical procedures previously

considered. Ventral fixation may be simple, or complicated by the separation of the adhesions of a backward displaced uterus, or the association of this latter condition with diseased tubes and ovaries which require removal. The performance of a laparotomy, and the stitching forward of an unattached uterus, in view of the other methods at our command, I consider unwarrantable. The conditions in which it may properly be considered are thus limited to two, viz.: Laparotomy performed for the specific purpose of separating adhesions and bringing forward the uterus; or laparotomy performed for the purpose of removing tubes or ovaries, and incidentally bringing forward the uterus and fixing it. My personal experience is limited to three operations; two of my own and one at which I assisted, and which, the later history being known to me, I feel may well be included in this report.

CASE I.—E. E., single, 34 years old; has spent years in receiving uterine treatment, and suffered from all kinds of pessaries. Examination shows a retroflexed uterus, attached by broad organized bands posteriorly to the rectum, less so laterally. Both tubes and ovaries prolapsed, enlarged, and so tender no pessary could be borne. I had made one attempt to forcibly replace the uterus without success. I operated, anticipating removal of the uterine appendages would be necessary, on Nov. 16th, 1888. After opening the abdomen and freeing the adhesions binding the tubes and ovaries, a careful examination showed them practically free from disease, therefore I did not remove them. I operated by cutting and tearing all the adhesions binding the uterus, which was so firmly wedged into the pelvis that the hand of an assistant in the vagina was necessary to raise it from its bed. I secured it by two catgut stitches, one upon each side, snugly to the abdominal wall, at the lower angle of my abdominal wound, scraping both uterine and parietal peritoneal surfaces until the blood

freely oozed, with the idea of obtaining adhesions which would assist in holding the uterus in its new position. The stitches were passed through the uterine tissue to a depth of quarter of an inch, carefully avoiding the Fallopian tubes, though including the abdominal parietes to the depth of one half inch. The wound was closed without drainage. There was very little bleeding from the adhesions and no ligatures were necessary. The patient made a perfectly normal recovery. On June 4th, seven months after the operation, the uterus was found forward in absolutely unchanged position, and the remains of the adhesions, which for three months could be felt quite prominently in the Douglas fold, were no longer to be detected. The tubes and ovaries lie in a relatively normal position, and are but slightly enlarged or tender. While many of the symptoms have been relieved by this operation, she is still far from well, but a good deal of this is due to her poor general condition. [*Note.*—August 1st, the uterus is still in perfect position.]

CASE II.—E. S., 33, single; has also received local treatment for many years; has had fistulæ in ano, the sinuses of which have extended high up both in front and behind the rectum, and in former years have been freely incised, so that the anal and perineal regions form a mass of dense cicatricial tissue. Within the preceding eighteen months I made two attempts to forcibly replace the retroflexed uterus, under ether. While there was no evidence of tubal disease, neither of these operations was successful, because of strong, flat, lateral bands, which immediately drew them up backward. Following these two operations, partial success was obtained, so that a pessary was worn with comfort, for some months, and gave great relief. The uterus flexed over the support again, however, and on Dec. 4th, 1888, was attached as firmly as ever. Operating at this latter date by laparotomy, I found it impossible to start

the uterus from its bed under the promontory without the combined use of the uterine elevator and the hand inside the abdomen. The posterior adhesions were peeled off very rapidly, and the lateral adhesions were found to be the thickened, shortened, broad ligaments, which had become, from long-standing chronic inflammation, converted into cicatricial bands. The tubes lying along the upper part appeared perfectly healthy, also the ovaries, so that I did not feel justified, in deference to the expressed wish of the patient, in removing them as otherwise I should have done. It was impossible to bring the uterus close to the abdominal wall anteriorly, because of the tension which those broad ligaments exerted. Thinking that a stitch inserted from the fundus would be almost certainly torn out from the force with which the uterus was held downward, I put it just outside the fundus around the broad ligament and carried it up into the abdominal wall. A decided hæmorrhage followed this, though no bleeding vessel could be found, but it was necessary to tie a portion of the broad ligament en masse. On the left, the rectum and numerous coils of small intestines were found matted together and adherent to the broad ligament. It was impossible to separate these. The uterus was secured only upon one side. The wound closed without drainage, and the patient made an uninterrupted convalescence for ten days, when an abscess, which had given no signs of its presence by temperature, discharged from the abdominal wall, forming a fæcal fistula near the opening, which enlarged to the size of a silver fifty-cent piece. All the fæces and enemata discharged through this fistula. Subsequently, the uterine abdominal stitch, which was of silk in this case, came away. The fistula gradually closed and the patient was discharged three months after the operation, the uterus retroverted to the second degree, not tender, not adherent as before, and the patient able to go up and down stairs, walk fairly long

distances, and much improved in her general health. Previously to the operation she had been unable to walk at all.

Case III.—Not my own case. Failure anatomically and therapeutically. Mrs. X. Enlarged retroflexed uterus. Strong flat adhesions extending posteriorly only. The operation was performed in the same manner as the preceding. No complications. The stitches were silk, passed around the round ligament and well into the abdominal wall. Convalescence perfect. At the end of two months the uterus was well forward and still united to the peritoneum of the abdominal wall. One month later it was retroflexed and adherent, and surgically and therapeutically the patient as badly off as before.

The report of these three cases constitute, so far as I know, the record of all the cases in this city for which laparotomy has been performed for the specific purpose of separating the adhesions of a retroflexed adherent uterus, bringing it forward and stitching it to the abdominal wall, in which there has been an interval of sufficient time to record an opinion as to the success or not. What are the results? The first case, seven months after operation, the uterus is retained in its new position. The second case, uterus remains partially forward; patient's general condition improved, but a protracted and anxious convalescence. The third case, entire failure.

COMMENTS UPON THE OPERATION.

The technique of the operation under consideration may be quite simple, or may offer decided complications. The new position of the uterus anatomically is faulty, only in a less degree than the old. The suspension of the uterus depends either upon formation of adhesions with the peritonæum of the abdominal wall, or the suspensory strength of the stitches which are inserted; and should the uterus fall away from its new point of attachment, there is an excellent op-

portunity afforded for the incarceration of a coil of small intestines if these stitches hold, and if they cut out or are removed, then there is nothing to hold the uterus except such adhesions as may have formed.

Schücking's method of anterior fixation, the last of which I shall speak, is practically performed by its originator only. Naturally, he claims good results, but for both theoretical and practical reasons it seems to me so decidedly inferior to other methods that I have never adopted it. It is applicable only to such uteri as may be free from adhesions. Schücking, stating that the ordinary method of stitching the uterus to the abdominal wall does not produce firm enough adhesions to secure it permanently, proposes to accomplish the result by stitching the fundus directly to that portion of the peritoneum which is reflected backward from the pubic arch forming the anterior pelvic floor; that is, the anterior peritoneal roof of the vagina. A special needle is employed, by which the stitch is carried up through the cervical and uterine canal, passing through the fundus and then forward and downward until it emerges into the vagina, where it is tied and remains until there is a decided adhesive peritonitis set up. The bladder is to be pushed one side by a sound manipulated by an assistant. Schücking states that in twelve cases the stitch passed through the bladder instead of beside it, three times without leaving any bad results.

I have purposely alluded in the briefest way to separating the adhesions of backward displacements when laparotomies are performed for the removal of diseased tubes and ovaries, because it would carry this discussion outside the strict limits of my subject. My own view upon the question is, that unless there are such decided symptoms of trouble from the displacement as leave no room for doubt, it is better to let the uterus alone. If it is decided to attempt its replacement, secure it forward by one of the methods of shortening the round ligaments rather than by ventral fixation.

SUMMARY.

From the results of my own operating I have drawn for my guidance the following rules :—

Be sure the displacement is the cause of the symptoms. Never resort to operative measures without first exhausting all forms of non-surgical treatment in so far as they may be applicable to the case under consideration. An adhesive backward displacement of the uterus demands for its cure, first, separation of its adhesions; second, anterior fixation. Separation may be accomplished, first, by forcible divulsion without opening the abdomen; second, by laparotomy and subsequent divulsion or cutting. The advantages of the first method are that in suitable cases the patient is exposed to few dangers beyond a simple traumatic peritoneal inflammation. The advantages of the second are that it supplements the first; assuming greater risks it strives for greater successes; the adhesions being dealt with more openly, any accident that may arise is more easily remedied; it can be employed in cases to which the first is inapplicable. It superadds, however, the dangers of a laparotomy.

A backward displacement which is *free* originally or which has been *freed from its adhesions* may be secured forward, 1st. By shortening of the round ligaments, either by the Alexander–Adams or Wiley method. 2d. By fixation of the uterus to the peritoneum of the anterior abdominal wall, or to that of the anterior pelvic floor (Schücking's Method).

Of the four operations, the only one not involving interference with the peritoneum is the Alexander–Adams. I believe that it should be selected, from my own experience of its successful results. I make an exception, that if for any *other* reason the abdomen has been opened, Wiley's operation may perhaps prove its equal.

These round ligament operations leave the uterus in

practically a normal position, without undue tension on tubes, intestines, or blood-vessels. There is no danger of fæcal fistulæ or incarceration of the intestines; no interference with subsequent pregnancies. Permanent successful results do not depend upon adhesions or suspensory stitches, and the uterus is left moveable, not fixed.

DISCUSSION.

Dr. F. H. Davenport, of Boston :—A few years ago the cases of backward displacements of the uterus, especially with adhesions, were looked upon as the *bête noir* of gynæcology, and as hardly to be remedied.

Cases with old adhesions that were well organized were spoken of as incurable. That has now changed, and the question is not, "Can this woman be cured?" but, "By what method shall we cure her?" Almost every case of back displacement can be practically cured.

Sänger, of Leipsic, considers that 20% of the cases of backward displacements must be operated upon, *i.e.* are not curable by non-surgical measures. That seems to me to be too large a percentage of incurable cases; those of us who have had experience and have practised to any great extent the method of replacing the uterus and overcoming adhesions by systematic packing the vagina, will hardly confess to failure in 20% of cases. 10% and possibly 5% of all cases of backward displacements of the uterus would be a fair estimate in which we have to resort to operative measures.

When laparotomy is done for some other purpose, the additional strain of separating the adhesions is comparatively slight. If the patient is clearly suffering from the symptoms due to displacement, in addition to the special cause for which laparotomy is done, I should by all means separate the adhesions, bring the uterus forward and sew it to the abdominal wall; but if not, I should leave the uterus alone.

To sum up what I have to say then, 1st, never give up too quickly those cases in which there are apparently firm

adhesions; for I have seen such adhesions give way and disappear, and the uterus permanently retained in place by well-fitting pessaries, after months of careful treatment by packing. 2d, never discourage any patient, but rather tell her that even if the simpler methods of relieving her do not succeed there are still others which can be tried. Of course the order in which these measures will be tried will depend very much on the conditions of our patient.

Dr. E. W. Cushing, of Boston:—I have had some experience in these operations. In regard to the Schultze operation, I recorded a year ago six cases done a year previously; five I believe did very well.

I have had two cases of sewing the uterus anteriorly this year which were not exactly Wiley operations, but more nearly the common hysterraphy. I used a running cat-gut suture, brought out in one case through the abdominal muscles, and in the other case through the skin. Both cases did very well. There were some adhesions in one case, in the other none.

I have had some eight cases of the Alexander operation; two suppurated on both sides, one on one side. It prolonged the convalescence, without further trouble. I have tried three different ways: the original way by tying the two round ligaments together, leaving both ends attached and taking a bight in under the fascia; by making a small opening ½ to ¾ inch upward from the ring, and hooking the ligament out; and by cutting the distal end of the ligament, bringing together and tying. I was sure by the last method as long as these ligaments lasted that there was no slipping, and they have the advantage that if they do slip no harm is done.

Wiley's method of bringing out the ends of the cat-gut or silk through the abdominal wall occurred to me as likely to increase the effect—bringing the ligaments close by the abdominal wall, holding the whole uterus forward, preventing the chance of intestines slipping in there. These cases have done well. I should hardly feel at present like opening the abdomen to do that in case the uterus was free, where I could do the Alexander operation. There is a certain risk about it, and a case of that kind dying of sepsis would make one feel worse than a case that dies of fatal disease.

Of Schücking's operation I have no knowledge and very little faith. It seems surely as dangerous fastening the uterus forward by running a needle through it and bringing it through the vagina as to perform a laparotomy. Considering all the chances of carrying septic matter through the uterus, it seems hazardous.

The question that arises in all these cases is when to interfere; and the necessity of interference must depend on the social condition of the patient, where she comes from, and her chance for other treatment. There seem to me to be three indications which justify opening the abdomen to correct this displacement:—

1. To get the woman out of bed where she is practically bed-ridden.

2. To keep the woman practically out of the poor-house where she is dependent on her own exertions, and is incapacitated,—in such cases, even if the woman is not abed and understands that there is some danger, we may proceed and open the abdomen if necessary.

3. Where the woman lives in a place where she cannot get treatment, comes from a distance in the country, and where, applying at a hospital, she is prepared and comes ready to take some risk.

Dr. F. L. Burt, of Boston:—I would classify these cases of backward displacement as follows:—

1. Cases in which there are no ruptures of any kind, a small uterus, and simple version or prolapse.

2. Cases of heavy uterus, which may be cases of subinvolution associated with endometritis or lacerated cervix.

3. Heavy uterus with tumor,—fibroid.

4. Condition in which the uterus, whether heavy or not, descends on account of rectocele drawing it down.

5. Other conditions in which we have tumors outside of the uterus, which have their effect on the uterus. Any tumors of the ovary or broad ligament or Fallopian tubes have that effect.

6. Adhesions of the broad ligaments themselves, and there are backward adhesions which draw the uterus backwards. When we get any of these cases they all seem to demand different operations. Usually, unless there is something in the nature of the disease of the tubes or

ovaries or broad ligament which needs the abdominal incision, I should not feel justified in making an abdominal incision, in performing any operation for bringing the uterus forward; but if such is the case, the operation by Dr. Wiley I should prefer to that recommended by Alexander. I do not believe that the latter is exactly a scientific operation, and I fear that it might be done many times when the uterus was heavy and not separated at all; in a case where a lacerated cervix needed to be operated on or the uterus curetted. I have known quite a large number of cases in which the Alexander operation, as done, was a failure, and probably because the round ligaments were not separated by pulling forward. I think operations are done in a good many cases in which more simple treatment would suffice. There are some instances in extremely fleshy people in which the Alexander operation might be necessary. So far I have not seen such a case a success. The most I have known have had to wear supporters a long time.

ARTICLE XXIII.

ANTIPYRETICS.

By EDWARD N. WHITTIER, M.D.
OF BOSTON.

READ JUNE 11, 1889.

ANTIPYRETICS.

THE mean bodily temperature of warm-blooded animals results from the correlation of three factors, heat production, heat dissipation, and heat regulation. It is an expression of the balance maintained between the heat produced in the body, and the heat lost from the body, through the influence of a regulative process; it is an equilibrium of temperature, or state, in which the heat produced by chemical changes chiefly in the muscular envelopes of the skeleton and in glandular structures, has a counterpoise in the heat discharged by the skin and respiratory organs, in the process of evaporation, conduction and radiation.

The "constant bodily temperature" of health is the marvellous maintenance of an almost uniform temperature by the mechanisms which coördinate the loss with the production of heat.

Temperature regulation by variations in heat loss, and temperature regulation by variations in heat production, have a common source, in a thermo-taxic mechanism which not only controls normal temperature, but also explains the processes by which abnormal temperatures prevail in disease, for fever of necessity implies a disorder of the thermo-taxic mechanism.

What is fever? How defined, what its nature, its pathology, its mechanism, its etiology; what are the various

---

I desire to acknowledge the valuable assistance rendered in the preparation of this paper, by Dr. E. M. Greene, Pathologist Boston Dispensary and Carney Hospital.

theories bearing upon this subject, and where are the clinical aspects of the Fever question to-day?

These and other topics of kindred significance have recently formed the subjects of papers of great value, representing the most advanced opinions and the best conclusions based upon original research and recent literature.

Kindly permit me to preface the subject assigned me with a synopsis of the views relative to fever which are entitled to representation here; for there can be no intelligent and profitable discussion of the subject of Antipyresis which is not based upon a fair understanding and agreement as to the significance of the term Pyresis.

No one, to-day, rests his definition of fever on the single symptom of elevation of temperature, nor does any one fail to recognize fever as a symptom complex, or group of symptoms, in which disordered heat occupies the dominant position and is necessarily the essential feature; but associated with this and so intimately blended with it as to be deservedly regarded as part and parcel of the process known as fever, are the other symptoms of the group,—disordered circulatory and respiratory functions, loss of muscular power, digestive derangements, changes in glandular secretions, notably of the kidneys, impaired nutrition, tissue changes, loss in weight, and symptoms referable to the nervous system.

Elevation of temperature is the essential and predominating factor in fever, and the questions as to the cause of this abnormal rise are various and vexing, and are by no manner of means as yet adjusted, although during the past two or three years greater advances have been made than ever before towards the solution of the problem.

The combustion theory, the hæmic, the zymotic, the traumatic, the chemical, the nervous theory,—each has its advocates and its zealous defenders; but the weight of evidence and of influence, the teachings of physiology and

of pathology, influences powerful in moulding opinion, are in the direction of assigning to the nervous theory the highest position as an exponent of the method by which increased production of heat becomes the dominant element or symptom in fever.

It has been said, and well said, that the nervous theory of fever rests upon the tripod of heat regulation, heat discharge, and heat production, and that the normal as well as abnormal temperatures can be explained by the predominance in varying degree of each of these processes.

Dr. MacAlister, in his lectures on the nature of fever, argues that the doctrine of evolution as applied by Hughlings Jackson to the motor functions, can be applied with equal directness and force to the heat producing functions, that the element in thermal mechanism which is lowest, the heat discharging, is the earliest and the best organized; this is the vaso-motor apparatus long since demonstrated to control the circulation of blood in the superficial part of the body, thereby in great measure controlling the discharge of heat; the other factors in the process of heat discharging, respiratory and sudorific, are equally well under the control of the nervous system.

Heat producing, the element of thermal mechanism which is second in the order of development, is in fair way of definite localization. There is certainly an inhibitory centre which depresses or controls the production of heat, probably by acting on the trophic cells of the gray matter of the spinal cord (H. C. Wood). It is also part of the logistics of heat mechanism that there are cerebro-spinal centres which when stimulated excite heat production.

The third element, the most sensitive, the most unstable and the last in the life of the individual to reach its point of adjustment, is thermo-taxis, or heat regulation. No one has yet localized it; no one has more than described it as least organized, least automatic, least and last developed. It

coördinates heat dissipation with heat production. Thermal ataxia implies irregularity of temperature and that alone.

Thermotaxic and thermogenic disorders when coexisting imply ordinary fever, while disorder of all, heat regulation, heat production and heat dissipation, implies a dangerous increase of heat, a steadily rising temperature, a general hyperpyrexia of extreme gravity. (J. C. Wilson, General Pathology of Fever.)

Puncture of the caudate nucleus and injury to the spinal cord in the upper cervical region have each been conclusively demonstrated to be causative of increased heat production and elevation of temperature, and these experiments on animals have induced all the essential conditions of fever, viz., increased heat production, increased heat loss, increased absorption of oxygen, increased formation of water and carbonic acid and large increase in formation and elimination of urea, with corresponding changes in pulse and temperature curves. McAlister and Welch, McAlister propounding, Welch seconding, discuss the question of the origin of the heat producing phenomena in the existence of nerves whose chief function is on the one hand the disintegration, on the other hand the restoration of muscles, basing these conclusions largely on the results of the researches of Gaskell, whose conclusions were that, inhibition, for instance of the heart's muscle, is restorative, through the influence of the pneumogastric, and that the accelerator nerves of the heart induce opposite or destructive changes, and that the muscular substance when disintegrated gives rise to heat and mechanical work.

"If it be found (Welch) that similar inhibitory and accelerator nerves preside over the chemical changes in voluntary muscles and other tissues of the body, then Gaskell's induction as to the existence of thermo-excitory and thermo-inhibitory nerves ranks as one of the most profound and important in modern physiology."

According to Maclagan, the thermal nervous apparatus

consists of:—1st, tissues in which heat is formed; 2d, heat eliminating surface; 3d, a thermic centre, controlling heat; 4th, nerves from the central controlling power to the heat forming parts of the body; 5th, nerves connecting the heat controlling centre with the parts involved in heat elimination.

So long as all these parts of the thermal apparatus are in harmonious operation, normal temperature prevails, but interruption of this harmony causes the temperature to rise or fall.

Maclagan does not regard as antagonistic the two theories of fever which have secured the strongest foot-hold, viz.: the combustion, and the nervous, theories; he regards each complete in itself, that the combustion theory, "according to which the rise of temperature results from increased activity of the processes by which heat is naturally formed in the body," is no way inconsistent with the neurotic theory, according to which the rise in temperature is due to impairment of that inhibitory force by which heat production is restrained and kept within normal limits.

Austin Flint embodies his views in three propositions:—

1. It is probable that the original cause of most if not of all the essential fever is a micro-organism, different in character in different forms of fever.

(This conclusion is based upon recent advances in bacteriology.)

2. Restricting the definition of fever to the expression, "an abnormal elevation in the general temperature of the body," he regards the pyrexia as due to oxidation of certain constituents of the tissues, due to micro-organisms in the blood; that this oxidation results in increased waste of tissue and is represented by an excess of carbonic acid and urea excreted.

The part which the formation of water within the body plays in the production of heat, is either suppressed or is greatly diminished in prominence.

3. Fever produces abnormal consumption of fat with parenchymatous degenerations; and finally he defines an essential fever "as an excessive production of heat in the body induced by a special morbific agent or agents and due to excessive oxidation, with destruction of the tissues of the body and either a suppression or a considerable diminution in the production of water."

Professor H. C. Wood summarizes our knowledge of fever in three propositions:

1. Fever is a disturbance of calorification in which through the nervous system heat dissipation and heat production are both affected. If there be a fever which is produced by the direct action of a poison independently of the nervous system, we have at present no proof of its existence.

2. Heat production is regulated by a nervous apparatus of which our knowledge is still imperfect. There is certainly an inhibitory centre which depresses or controls the production of heat. It does this probably by acting on the trophic cells of the gray matter of the spinal cord. It is also probable that there is a centre which, when excited, increases tissue change, but its existence has not been absolutely proven.

3. Heat dissipation is regulated through the nervous system, so that vaso-motor paralysis is followed by an enormous loss of animal heat, and under unfavorable conditions by death from cold.

The views of the German school are thus defined in a paper recently published:

Bacteriological investigations have resulted in great advances in our knowledge of the etiological factors of disease. Ziemssen states that we now believe that the effects of the action of harmful agents on an organ or group of organs or on the entire body, are the necessary consequences of action on the cell, and the consequent changes in the physiological function of the tissues.

The bacteriological theory of the need and usefulness, in all infectious diseases, of a high temperature, has had many and able advocates, who have argued that the febrile movement was a proper expression of the resistance developed in the patient, reactionary in its influence and results, and destructive to the micro-organisms productive of the fever.

Welch, in his Lectures on the Pathology of Fever, says :— There is much which speaks in favor of this doctrine. The real enemy in most fevers is the noxious substance which invades the body, and there is nothing to prevent us from believing that fever is the weapon employed by nature to combat the assaults of this enemy. The doctrine of evolution indicates that a process which characterizes the reaction of all warm-blooded animals against the invasion of a host of harmful substances, has not been developed to such an extent and is not retained with such pertinacity without subserving some useful purpose. The supposition seems more probable that the increased oxidation of fever aids in the destruction of the injurious substance. According to this the fever producing agents light the fire which consumes them. It is not incompatible with this conception of fever to suppose that the fire may be injurious to the patient and require the controlling hand of the physician.

In opposition to this view of the salutary influence of fever, are the results in febrile infectious diseases, wherein treatment not only abates the fever but also the infection. Mention may be made of the periodical fevers, of rheumatism, &c. ; in these diseases specific remedies induce desired results by reduction of temperature and diminution of infectious material. And by analogy and in those infectious diseases wherein there are no specific remedies, experience guides us in the employment of methods by which fever and the morbid processes due to infection are reduced to the minimum of harmful influence.

It is upon this broad platform of clinical experience,

upon this firm and enduring basis, that the doctrine of antipyresis rests, and the questions propounded in the laboratory of experimental pathology and of bacteriology find their answers in the results of observations at the bedside.

The change to the present and prevailing opinion concerning the nature of fever (for the neurotic theory is the prevailing doctrine) finds its parallel in the change of opinion in relation to the harmful effects of high temperature.

Careful analysis of the transactions of the first and fourth German Congresses of Internal Medicine cannot fail to impress one with the strength of the position occupied by German clinicians and physicians, in the opinion, that high temperature and that alone cannot longer be considered the dangerous element in fever. The recent review of the pathology of fever by Professor Welch of Johns Hopkins University, leads up to the conclusion, confessedly an advanced position, "that even in fevers, such as typhoid fever and pneumonia, when the height of the temperature is undoubtedly a most important index of the severity of the disease, there exists no such parallelism between the temperature and the nature and severity of the other symptoms as we should expect if these symptoms were caused by the increased heat of the body, and both clinical and experimental observations strongly support the view, now widely accepted, that the disturbances of the sensorium which constitute so prominent a part of the group of so-called typhoid symptoms, are dependent upon infection," or upon the poisonous substances produced in the body by the pathogenic micro-organisms rather than by high temperature.

The various opinions expressed are well condensed by Baruch, in his admirable article on the treatment of typhoid fever:—"Since it may now be regarded as an established fact that high temperature, minus infection, does not produce those serious degenerations formerly ascribed to it,

we must seek in the infection process and the ptomaine intoxication those deleterious effects upon the vital organs which undermine the system and eventually cause death."

I recognize distinctly, and all the more forcibly from a somewhat extended examination of the literature of the subject, the great obstacles in the way of a satisfactory exposition of the present status of antipyresis and antipyretics. I have endeavored to place before you briefly, necessarily so, by reason of the limitations placed by custom upon papers prepared for these occasions, some essential facts; but without much greater elaboration of the subject I cannot otherwise than rest here in my definition of fever, and ask your attention in the remaining portion of this paper to the practical application of the subject assigned me.

Antipyresis includes all measures designed to reduce temperature and to resist the noxious influences of the various infectious and toxic fever-producing agents. Classification of the means employed is not simple; for the therapeusis of antipyresis is a complex subject, and whatever of confusion may seem to exist, can only be explained by the lack of harmony in the various and varying views still entertained as to the nature of fever and the methods to be employed for its control. Those who believe the harmfulness of high temperature rely upon antithermic medication, while those who regard high temperature as relatively harmless and assign to micro-organisms and chemical changes the most important position, causative of the complex process known as fever, rely upon measures to increase the dissipation of heat, and through the influence of the nervous system to improve individual powers of resistance.

Antithermic remedies of recent date include all of the so-called aromatic series, the modern synthetical compounds. The true antithermics act absolutely (according

to Wood) on heat production and heat discharge (thermolysis and thermogenesis), through the inhibitory nerve apparatus, diminishing in similar manner, though not in equal degree, heat production and heat dissipation; heat production falling decidedly more, as a rule, than does heat dissipation. This effect has been proven to be independent of any influence on the circulation, and in all probability the result is produced through the nervous system directly upon the chemical movements of the organism.—(Wood, Trans. Am. Assoc. Physicians, Vol. II.)

Antifebrile remedies include the "false antipyretics," which increase heat dissipation by acting upon the vaso-motor system and inducing vaso-motor paralysis, of necessity producing the discharge of animal heat in large volume. Prominent in this class we recognize aconite and veratrum viride, and it is not altogether improbable that in a limited degree by a similar effect on the vaso-motor apparatus some of the so-called antithermics exert an influence on cutaneous and respiratory discharges of heat.

Both the false and the true antipyretics (and this latter class is made up of those drugs which diminish heat production primarily, and only secondarily and in an unimportant sense promote heat dissipation) have of late fallen into disfavor as means to control the course of disease, to lessen complications or to reduce the mortality rate. Glénard closes the discussion before the Society of Medical Sciences at Lyons by stating that the law once more verifies itself that the obituary curve oscillates in direct ratio with the consumption of antithermic remedies, and inverse ratio to the number of cold baths administered.

Abstraction of heat by cold baths is far less important in its effects than the vitalizing of nerve centres through the reflex stimulus aroused by low temperature applied to the peripheral nerves, and by a reduction of the temperature of the blood circulating in the internal organs.

It is considered that the result of this lowered temperature of the blood is a grateful stimulation to the nervous system, and that the reflex stimulus of nerve centres by cold bathing of the surface of the body induces an innervation for circulation, digestion, respiration, tissue formation and excretion, so that the rapid heart is slowed, the hurried respirations are checked, the failing digestive powers are quickened, and muscular irritability is allayed. Quiet takes the place of restlessness, wandering and delirium disappear, anorexia gives place to desire for food, and more than this the digestive powers are strengthened, nutrition improves, and the waste of tissue is lessened.

The advocates of the antithermic, internal antipyretic and expectant method in antipyresis, have placed much reliance on the experimental and physiological action of cold applied to the surface of the body, as determined by the researches of Frédéricq of Liege and others, by means of the well-known apparatus of Regnault and Reisset.

The conclusions that "we are warranted in affirming as a physiological law, that under the influence of cold baths, organic combustions are energized and augmented," would appear to be well drawn, and would appear to afford to many a fairly reasonable excuse for not entering upon a course of treatment which might be accompanied by danger greater than that which was hoped would be neutralized; and the teachings of experimental physiology would seem to justify us in regarding the method of cold baths, considered as antipyretic and applied to the treatment of febrile phenomena, as an irrational practice; but we find in the abstraction of heat, in the tonic effects of cold water, in the sedation effected in the nervous phenomena induced by the febrile process; above all in the results of saving human life, an answer to all objections, a refutation of all opposing theories, and a justification of the method.

And this brings full before us for consideration the wonderful, the phenomenal, the almost miraculous control exerted over the death-rate in our chief infectious disease typhoid fever, by the use of cold baths as an antifebrile agent. And permit me here to remind you that the febrile movement is to be regarded as a symptom complex, in which high temperature no longer occupies the chief place, the prominent position formerly assigned to it, but is secondary in its influence to that exerted by the more important group of fever-producing agents formed by the pathogenic micro-organisms, the chemical changes set up in the tissues and the intoxication developed in nerve centres by the ptomaines, the alkaloids of decay. Let me here repeat an axiom in antipyresis. "Abstraction of heat by cold baths is far less important in its effect than the energizing of nerve centres through the reflex stimulus aroused by the shock to the extensive peripheral nerve endings, whereby innervation is furnished for circulation, respiration, digestive tissue formation and excretion, so that the system is enabled to tide over the dangers which would ensue from failure of these functions." This, writes Baruch, in his admirable article on the treatment of typhoid fever (The Medical Record, Feb. 16, 1889), is the effect of cold bathing in a nutshell,—the simple cooling of the blood occupies a secondary though not unimportant office.

Permit me to spread before you, and here I again avail myself of a recent paper on the treatment of typhoid fever, "Statistical Evidence in support of the claims of the Advanced School of Hydrotherapy"; and you will doubtless concede that never in the history of medicine have statistics of such magnitude, from such reliable and diversified sources, been brought to bear upon a question of therapeutics.

Baruch states that he had gathered from the New York City Board of Health Reports, from 1876–1888, 7,712 cases of typhoid fever, with a mortality of 41.28 per cent.

Dr. Delafield, in 1885, states that the mortality of typhoid in the New York Hospital was 24.66 per cent. The mortality rate in the Boston City Hospital has been 13 per cent. The mortality rate in the Massachusetts General Hospital has been 16 per cent. Brand collected 11,124 cases, treated on under the expectant plan, with a mortality rate of 21.7 per cent., and with infinite labor and pains, the record of 19,017 cases, to show that " under the general influence of all kinds of cold bath treatment, without, however, its strict enforcement, the mortality had been reduced from 21.8 to 7.8 per cent.

Brand also obtained from twenty-three sources, German and French, of undoubted authenticity, reports of 5,573 cases treated by the cold bath, as advised and urged by him, with a mortality rate of 3.9 per cent.

In the Second Prussian Army Corps, between the years 1849–1866, there were 1,970 cases, with a mortality rate of 26.3 per cent. Later, and under the cold bath treatment, in 2,711 cases the mortality rate was reduced to 4.30 per cent. This contrast is all the more striking when it is considered that at the same time the mortality rate among French soldiers was, 32.2; among Italian, 28.6; among Austrian, 27.4; and in the English service, 23.8. Vogel quotes 713 cases, with a mortality rate of 3.40 per cent. Uannyn, 145 cases, with a mortality rate of 6.9 per cent. Brand, an additional series of 2,198 cases, with a mortality rate of 1.7 per cent. Juergensen, Vogel, Brand, and some others, furnish reports of 1,223 cases, treated strictly and rigorously in accordance with the plan devised by Brand, with a mortality rate of 1 per cent.

From the latter part of the last century, when Currie published his work on the treatment of acute diseases by cold, up to the present time, but particularly between the years 1861 and 1877, many and important as well as authoritative works have been published bearing upon the

treatment of febrile diseases, especially the acute infectious diseases, by cold baths.

Currie, in 1797; Giannini, in 1805; in 1812 the results of Recamier's labors; in 1822 Hufeland; Scouttetin in 1843; Jacquez in 1847; and in 1852 the classical work of Leroy. But it remained for Brand, as early as 1861, and in the succeeding years up to 1877, to accomplish the wonderful results described by Ziemssen, as "the work of one who by the precision and rigorousness which he has put into his method of refrigeration, has merited the right of associating his name with this work of treatment of typhoid fever," the disease, in which, above all others, antipyresis exerts the largest and best influence.

I introduce at this point, in order that I may reinforce the statement relating to difficulties in the classification of the means employed in antipyresis, the division made by Ziemssen in his recent lecture on antipyresis and antipyretics.

Ziemssen groups authorities according to their opinions of the value and form of antipyretic treatment into six divisions:—

1. Of those who use the cold bath and do not employ internal antipyretics.

2. Of those who employ luke-warm baths, but do not use internal antipyretics.

3. Of those who, governed by symptoms, make use of either the cold or the luke-warm bath, and internal antipyretics.

4. Of those who regard high temperature needful and advantageous, employing baths and internal antipyretics only in the presence of symptoms or complications dangerous to life.

5. Of those who regard high temperature as necessary and refuse all measures leading to its reduction, confining their attention to the diet.

6. Of those who deny the influence of treatment in the reduction of the rate of mortality.

From this it may be seen that even in Germany, where the study of antipyresis and of antipyretics has been most profound, and the conclusions have been most carefully scrutinized and the effects of treatment, in one direction at least, have exceeded in the positive results of saving human life, all previous efforts, as yet there remains a very large, and it would appear an unaccountable lack of harmony, in views expressed, in conclusions maintained, and in methods governing treatment.

Our chief infectious fever, typhoid, has been selected for the study, in its clinical aspect, of refrigeration, and the influence on the disease, of the application of cold to the surface of the body.

The tables of results, as expressed in mortality rates by percentages, wherein the salutary influences of cold baths are compared with all other previous and present methods, ought to carry conviction most profound to the most skeptical—a conviction, that in not conforming to the requirements of the system of Brand, we should fall far short of doing our duty in this most important and frequent class of cases. Juergensen stated, in the congress at London, that "whenever he attempted to deviate from the rigorous cold water treatment, he was compelled to return to it in order to obtain the best results." I appreciate fully the objections which may be raised, growing out of the lack of the proper mechanical appliances, to enable us to comply with the requirements of the method of Brand in all its precision of detail, but the difficulties to be overcome are far from being insuperable.

I append herewith the method of refrigeration employed by Brand. The reasons why other physicians have failed to secure corresponding results, in the reduction of the mortality rate, in typhoid fever for instance, will be found in

defective application of the method, insisted upon by Brand; the defect will be found in the absence of the needful rigorousness and precision, so strenuously insisted upon by the originator of the system.

The method of refrigeration employed by Brand is thus described by Desjardin Beaumetz, in a lecture delivered in Cochin Hospital in 1878.

The bath-tub shall be placed near the bed. The bath-tub shall contain a sufficient quantity of water, so that the patient when immersed in it shall be completely covered up to his neck. The temperature of the water should not exceed 20° C. (78° F.). Tripiér and Bouveret distinguished in this regard three varieties of cold baths,—baths with a temperature of 22° to 24° C., of 18° to 20° C., and of 14° to 15° C., and they regulate the temperature of the bath by the intensity of the fever and the resistance to refrigeration.

Before carrying the typhoid patient to the bath-tub, and in order to diminish the trying and painful sensation of cold, the abdomen is rubbed with the water of the bath. Then the patient is placed in the bath, and all the time that he remains there the head is showered with ice-cold water. It is understood that the hair shall have previously been cut short in order to render these affusions more active. Brand recommends also to rub the belly and back of the patient during the time of the bath. The patient is kept in the bath about fifteen minutes; in certain cases the bath may be prolonged to twenty minutes. At the end of this time the patient is taken with shivering and chattering, and is then removed to his bed, and his lower limbs are covered with blankets. As for the rest of the body, in summer only a simple sheet is employed, and in winter a sheet covered by a woollen blanket.

At the end of twenty minutes the temperature is taken, and during the period of comfort which ensues, some nourishment is given. Every hour the temperature is taken anew, and when the mercury resumes its ascending march, and reaches 39° C. (102° to 103 F.), whether during the day or night, the patient is again plunged into the cold bath.

Brand has fixed at about three hours the interval which should elapse between the baths, but this period may be made much shorter, and reduced to two hours, or one hour and a half if there be very high fever heat and great resistance to refrigeration. Brand insists also that in the interval of the baths the nurses should keep constantly applied over the abdomen of the patient compresses wet in cold water, and renewed as fast as they become warm.

It is well on the inception to resort to cold ablutions with towels (not sponging). Friction aids heat elimination by dilating the cutaneous vessels, and the shock refreshes the nerve-centres (Winternitz). Then the patient grows accustomed to the more energetic bathing, which may be opened with the half bath, combined with gentle chafing, and gradually culminate in the full bath at 65° F.

The patient, when taking the bath and at all times, should be well supported with such nourishment as is suitable for his condition,—milk, wine, broths, peptonoids, etc. No other treatment is employed.

Such is Brand's method in all its rigorousness and exclusiveness. In order that it may give success it must be applied from the very onset of the fever. In proportion to the tardiness and lateness of its inception, the chances of success are lessened. In reference to no mode of treatment has the appeal to statistics been more confidently made, and the advocates of refrigeration have endeavored to show that when Brand's system has been followed to the letter the mortality from typhoid fever is reduced to a very low figure.

Internal antipyretics or antithermics have had a large and enthusiastic following. It has not yet been demonstrated by those most skilled in the employment of these remedies to reduce temperature, that the duration of febrile disorders has been shortened, that their course has been modified in any essential particular, or that the mortality rate has been lessened. An eminent authority two years ago claimed that the mortality rate had been reduced by antithermics, but stated that his belief was that the small improvement was attributable to the comfort afforded the patient more than

to the removal of danger from high temperature; this year the same authority, after more careful study of the subject, states that he is prepared to agree with Brand that the only advantage from antipyretic medication seems to be that the patient is able to die with a nearly normal temperature.

The aspirants for antithermic honors have come upon the stage of action with imposing credentials and with all of the influences of hereditary tendencies towards the reduction of high temperatures, whenever and wherever found, by the use of antipyretic medication. The vast majority have played a feeble part in the process assigned them, and claimed for them, and have failed signally to gain for themselves a fixed position in the list of therapeutical remedies upon which reliance may be placed.

Quinine, Carbolic Acid, Salicylic Acid, Salicin, Salol, Antipyrin, Antifebrin, Thallin, Kairin, Acetphenetidin, Pyrodine, Methacetin, Phenacetine,—how formidable the array; how few the survivors!

I have the pleasure of presenting a summary of the latest and most advanced views and conclusions bearing upon the physiological, therapeutical and toxicological effects of those antithermics which in my opinion are entitled to a place as remedial agents in pyrexial disorders.

ANTIPYRIN.

This is a grayish crystalline powder of a slightly bitter taste, very soluble both in water and alcohol.

Nitrous acid produces with antipyrin a new compound, iso-nitroso-antipyrin, which crystallizes in small grayish blue crystals. The sweet spirits of nitre of the Pharmacopœia almost invariably contains free nitrous acid, and on addition of antipyrin a greenish color is produced by the formation of iso-nitroso-antipyrin. Very large doses of this product produce no perceptible effects on dogs and rabbits. The practical result therefore of mixing antipyrin

and spt. ætheris nitrosi is simply to render a certain amount of the former inert.

Given to animals in moderate toxic doses antipyrin causes first a cataleptic state, then increased reflex activity, opisthotonos and convulsions. Larger doses cause complete relaxation, loss of reflex activity, and death.

These results seem to be due to an action both on the spinal and cerebral centres and on the sensory and motor nerves, but the method of action is still obscure.

Moderate doses of antipyrin increase the arterial pressure, toxic doses lower it, and in the frog, paralyze the heart. These effects are probably due to vaso-motor spasm, since antipyrin seems to have an action similar to that of ergot in checking hæmorrhage.

Considerable doses in man produce a livid color of the face, especially marked in the lips, due to the production of methalmoglobin, though the blood corpuscles themselves are not destroyed even after toxic doses. Ordinary doses do not affect the respiration, but toxic doses diminish and finally arrest it.

Antipyrin is rapidly eliminated by the kidneys, appearing in the urine in half an hour and being mostly eliminated within twelve hours.

The urine is sometimes increased in amount, but may be diminished if free sweating has been produced. Urea is said to be decidedly diminished.

Temperature is usually lowered in normal and almost always in febrile conditions. The fall begins in about half an hour and is accompanied by profuse diaphoresis.

The depression of temperature usually lasts longer than that caused by other antithermics, continuing from two to twenty hours. It is accompanied by a reduction in the rate, but not in the force of the pulse.

This fall is independent of diaphoresis or of any action upon the general circulation, and is probably due to direct influence upon the heat centres.

Experiments upon dogs show that both in normal and in febrile conditions the fall of temperature is due to decreased heat-production and also decreased heat-dissipation.

Antipyrin has been recommeneded as an antithermic in almost all febrile conditions. It has frequently, however, caused collapse, and must be used with great caution. In phthisis especially, it appears to produce so much feebleness and depression as, in the opinion of various observers, to forbid its use. In typhoid the patient is usually more comfortable under the action of the drug than at other times. Sometimes, however, it causes a distressing vomiting. The antipyretic uses of the drug are at present attracting less attention than its analgesic properties.

The dose for an adult should not exceed twenty grains, and H. C. Wood advises that the first dose should not exceed ten grains. These doses may be repeated two or three times, at intervals of one or two hours. Three grains is sufficient for a child of two years, and should not be repeated more than once.

Idiosyncrasies in regard to susceptibility to the drug are not uncommon, and alarming conditions have been produced by small doses. A quantity well borne at one time may cause the most dangerous symptoms at another. In kidney disease elimination is interfered with, and toxic effects may arise. In some cases it is said to act injuriously on the heart muscle, and weakness of the circulation is a certain indication. In children with pneumonia grave toxic symptoms have been seen.

The following are some of the effects which have been observed to follow doses of fifteen to thirty grains:—Dizziness, vomiting, gastro-enteritis, increased frequency of pulse and respiration, dyspnœa, cyanosis, dryness of throat, coryza, urticaria, herpes, sudamina, erythema, macular eruptions, purpura, œdema of the face, arms and legs, rise of temperature, subnormal temperature, collapse. Several

deaths are reported, among them that of a girl aged ten years, who died after two doses of ten grains each; a woman with puerperal fever, after fifteen to thirty grains; another woman, after fifty-two grains in two doses. Granular and fatty degeneration of the liver and kidneys have been found, post-mortem, in some cases, and were attributed to the large doses of antipyrin which were given.

ACTETANILIDE OR ANTIFEBRIN.

This is a white crystalline substance prepared by heating together a mixture of anilin and acetic acid. It is without odor, causes a slight burning sensation on the tongue, is soluble only in 189 parts of cold water, more soluble in warm water, freely soluble in alcohol, ether and chloroform.

Given to animals it greatly lowers the temperature, interferes with the conduction of both motor and sensory impressions, decreases the reflex excitability of the spinal cord and causes convulsion movements. Toxic doses paralyze the peripheral motor nerves, abolish reflex activity, cause paralysis, coma and death.

Large doses cause a peculiar discoloration of the blood by reducing hæmoglobin to methæmoglobin. The red corpuscles become granular and in part dissolved, do not adhere in rouleaux, and the serum contains dissolved coloring matter. The amœboid movements of the white corpuscles cease. The prolonged action of large doses produces fatty degeneration of the heart, liver and kidneys.

In ordinary medicinal doses the heart's action is strengthened rather than weakened. The pulse becomes less frequent as the temperature falls, while tension at the same time rises. Experiments on animals have shown that even when injected into the veins, not the slightest fall of blood pressure is produced. Large doses depress the heart and cause collapse. It is generally thought that the cutaneous vessels are at first dilated.

Cyanosis occasionally occurs, but usually only after doses of seven grains or more. It passes off quickly when the administration of the drug ceases, and is not a serious symptom. It is probably a vaso-motor phenomenon, but may be due to the production of methæmoglobin.

Cutaneous rash is very rarely seen, but sudamina and redness may occur with profuse sweating.

Fall of temperature is produced both in pyretic and apyretic conditions, but this action is energetic in proportion to the height of the fever. The fall of temperature generally begins within an hour, reaches its maximum in two to four hours, and the effects of a single dose usually last from three to six hours or more.

The fall of temperature is usually accompanied by profuse sweating, but less than that produced by corresponding doses of antypyrin. Sweating does not cause the fall of temperature, since the latter occurs when the sweating is arrested by atropine or agaricine. Chilliness is sometimes noticed when the temperature begins to rise, but rarely rigors, and shivering is less common than after kairin, thallin or antipyrin.

Experiments on man and animals indicate that in fever acetanilide produces a fall of temperature chiefly by decreasing heat production. Enclosing animals poisoned by acetanilide in cotton-wool will not prevent the fall of temperature. Whether the antipyretic effect is due to direct stimulation of the inhibitory heat-centre, paresis of the spinal heat-centre, or to an action on the tissues themselves, has not been determined.

Toxic doses cause vascular paresis and increased heat-dissipation.

Respiration is but little affected by ordinary doses, but after toxic doses the respirations at first become superficial and frequent, then irregular, and finally cease.

Though comparatively insoluble, acetanilide is readily

absorbed, producing noticeable effects, sometimes in ten or fifteen minutes, especially in children. Vomiting or gastric irritation is caused only by toxic doses.

Most observers agree that acetanilide is a moderate diuretic, though not an irritant to the kidney. It is broken up in the system, but after large doses may be excreted in part unchanged, and in such cases methæmoglobin has been found in the urine.

The therapeutic indications for acetanilide appear to be exactly parallel to those of antipyrin. It has been highly recommended as an antithermic in almost all febrile conditions. Guttman, after trying the remedy in 181 febrile cases, says that in typhoid fever he believes that the results obtained with the internal antipyretics are at least as good as those obtained with the cold bath, and of these substances he deems acetanilide the best in this affection. He opposes the giving of small divided doses as ineffectual, and obtains better results with single doses of four to eleven grains. In typhoid he gives seven and one half grains morning and night, and occasionally three times a day. After twelve or fourteen days four grains is usually sufficient. In this way complete apyrexia, lasting often six hours, was obtained in every case, and the subjective sensations of the patients were greatly improved. Other observers have found small doses to bring down the temperature, quiet muttering delirium, relieve headache and produce sleep.

In phthisis it is a powerful antipyretic, but more liable to cause cyanosis than in any other ailment. It is best given with a stimulant, and sweating counteracted, if necessary, with atropine or agaricine. The usual sweating in phthisis is often diminished or avoided altogether by a dose given in time to prevent the evening rise of temperature. Children bear the remedy well.

In febrile conditions an average dose is from four to seven grains, and thirty grains a day is usually sufficient.

Rheumatic fever and pneumonia seem to require larger doses. Phthisical, weakly and anæmic patients require small doses. If used for some time an increase of dose is necessary to obtain the usual effects.

The long continued use of large doses in some cases causes anæmia and the so-called anilin cachexia, due to solution of the red blood corpuscles. In such cases fatty degeneration of the heart, liver and kidneys has been found, post-mortem, both in animals and men.

Single large doses may cause cyanosis, cardiac weakness and collapse. Ten grains has produced complete collapse in phthisis, and nine grains had the same effect in a case of pneumonia. In rare cases collapse may occur from small doses of three or four grains. In the case of a child four grains every two hours during the day caused death the same evening.

PHENACETINE OR PARA-ACET-PHENETIDIN.

This is derived from phenol, and occurs as a white crystalline powder without taste, almost insoluble in water but easily soluble in hot alcohol and in warm lactic acid.

Its physiological action on animals has been very little studied as yet, but is probably analogous to that of acetanilide. Very large doses have been given to animals without producing toxic symptoms.

Given in febrile conditions it is a reliable antithermic. The fall of temperature is gradual; begins in one half to one hour, reaches the lowest point in three or four hours, and is then followed by a gradual rise, the influence of a single dose of seven grains lasting from six to ten hours. The fall of temperature is always attended with free perspiration, but very rarely with any gastric disturbance, rash, cyanosis or collapse.

It has no depressing action on the heart, but seems rather to strengthen its action. The frequency of the pulse and respiration diminishes with the fall of temperature.

The amount of urine is said to be increased. Phenacetine has been detected in the urine, and is also found in the milk of nursing women.

It has been found useful in all febrile conditions. In typhoid fever, while lowering the temperature, it relieves headache, clears the mental condition and causes a general sense of relief. To maintain a low temperature, seven grains have been given every four hours, and even when continued for a considerable time these doses have rarely given rise to the slightest accident in fever cases. Thirty grains in twenty-four hours is usually sufficient.

In phthisis and other asthenic conditions it may cause a feeling of weakness, and should be used with caution. It has been given for months without any unpleasant symptoms, but seems to lose somewhat of its effect. The usual dose in febrile conditions is seven grains. Though safe in comparison with the other antipyretics, a few unfavorable results have been reported. Fifteen grains given in a case of migraine caused giddiness, flashes of light, trembling of the limbs and nausea. Ten hours later a second dose produced a feeling of intense cold, cyanosis, cold perspiration and dyspnœa.

In another instance, a papular eruption lasting three days appeared on the thorax, abdomen and arms. One half to three grains in the case of a child were followed by profuse sweating, intense cyanosis and collapse. In two cases in which ninety-two to one hundred and twenty-three grains were daily given, decided cyanosis was produced, and an examination of the blood revealed the presence of methæmoglobin.

PYRODINE.

This is a white crystalline product, sparingly soluble in cold water, and possesses very little taste.

Large amounts depress the heart and lower blood pressure by a direct action on the vaso-motor centre. It has a

directly depressing action on the spinal cord and lowers reflex action. Repeated doses produce jaundice due to hæmoglobinæmia.

Doses of eight to twelve grains cause marked reduction of temperature in two to four hours. The temperature remains low for several hours, when a slight rise occurs and is followed by a second reduction, so that the action of a single dose may last an entire day. The reduction of temperature is accompanied by profuse sweating, but no collapse, vomiting or nausea have been noted even with a considerable fall of temperature.

It has been found a reliable antipyretic in pneumonia, scarlet fever, rheumatism, typhus and typhoid fever. In the latter it readily caused toxic symptoms, namely: jaundice, hebetude, icteric urine, albuminuria and hæmoglobinuria. It should never be given in larger doses than twelve grains, and only once in eighteen or twenty-four hours, and not continued for more than a few days. If these precautions are neglected, fatal symptoms may be rapidly induced. Doses of three or four grains have been given to children.

METHACETIN, OR PARA-ACETANISIDIN.

This is the latest of the antithermic drugs. It occurs as a slightly reddish powder, of a slightly bitter taste, soluble in warm water, but less so in cold water, very soluble in alcohol. It is an efficient antipyretic, causing a fall of three to five degrees in a few hours, and frequently profuse perspiration. It may produce collapse, but so far no cases of vomiting, tinnitus aurium or erythema have been reported.

It is markedly poisonous to rabbits, doses of forty-five grains having produced convulsions and death. Its action seems to be similar to that of antipyrin. No hæmoglobinuria has been noticed.

We will now consider briefly the relative values of the internal antithermics:

The superiority of the recent antithermics has, since their discovery, led to the complete abandonment of the use of *salicylic acid* and *quinine* in fevers, except where they exert a specific action.

Kairin, on account of its dangerous, depressing action on the heart, and its destructive effects on the blood, has never been used to any considerable extent.

Thallin, although a prompt and powerful antipyretic, has so often produced violent chills, cardiac depression and gastro-intestinal irritation, that its use has steadily diminished.

Experience of *Methacetin* is still limited, but its poisonous action on animals and its tendency to produce collapse in man do not recommend it.

Pyrodine, as an antithermic, appears to be more prompt, powerful and prolonged in its action than antipyrin, acetanilide or phenacetine, but it also surpasses them in its ability to produce sudden toxic effects, and is especially dangerous in typhoid fever.

A comparison of antypyrin and acetanilide shows the following points of difference:—

ANTIPYRIN.	ACETANILIDE.
Action more rapid but more transitory.	Generally more prolonged and powerful.
More diaphoretic.	More diuretic.
Depressing after-effects.	Stimulating.
Gastro-intestinal irritant.	Non-irritating.
Easily toxic.	Rarely toxic.
Large dose.	Small dose.
Expensive.	Cheap.

These results are by no means uniform, but are sufficiently so to cause a general preference for acetanilide in febrile cases.

Phenacetine greatly resembles acetanilide in its physiological action and therapeutic effects, and so far as present experience shows is equally effective and even less liable to cause disagreeable or toxic symptoms.

DISCUSSION.

DR. F. C. SHATTUCK, of Boston:—This question of the treatment of typhoid by cold bathing is one which ought to receive earnest consideration at our hands, in view of the remarkable results attained by means of it in a very large number of cases in different countries, and by many others besides Brand. One cannot help asking oneself why the method has never been seriously adopted in this country, by a people which prides itself on being practical. We have, in the first place, been sceptical, and regarded Brand's statistics as too good. In the second place, the method is both troublesome and expensive, requiring a large force of attendants; moreover, it runs counter to popular prejudice. We should allow none of these reasons to weigh with us if by the adoption of the method we can reduce our typhoid mortality to 5% or less. That Brand and others have succeeded in doing this is more difficult to deny than to believe.

There is no doubt that the internal antipyretics reduce temperature, and that in some cases of typhoid their use promotes the comfort of the patient. But it seems equally clear that they neither shorten the course of the disease nor exert any marked effect upon it of any kind. We now know that we were quite mistaken in attributing to continued high temperature the change in the parenchymatous organs and the symptoms indicative of impaired activity of the nervous centres; and we have strong reasons for thinking that these are due to toxic alkaloids, certainly in great measure. There is no proof of any fixed relation between these substances and the pyrexia of the infectious diseases. Typhoid fever may exist in a virulent form with little or no fever, and Gläser's analysis of 200 fatal cases in Hamburg shows that pyrexia is not in itself to be dreaded. The speaker has recently analyzed 129 cases of this disease, all

that have come under his care in the wards of the Massachusetts General Hospital during the last three years. The mortality was 8.3%, and none of the eleven fatal cases were characterized by temperatures either temporarily or persistently higher than we see every day in cases unmarked by grave symptoms and ending in recovery. In the first of these years internal antipyretics were used to a moderate, in the second to a less, extent; in the third very rarely, and only when the temperature seemed in itself to be productive of discomfort to the patient.

While it does not seem to be a matter of vital importance whether this class of drugs is given or withheld in typhoid, there is good reason for deeming them dangerous in pneumonia, a disease of short course and in a fair proportion of cases ending by crisis from the third to the ninth day. If the antipyretic dose happens to immediately precede the crisis the patient may be placed beyond the need of any further medication forever.

Dr. F. H. Williams, of Boston:—In the treatment of fever there are many things which ought to be considered. Looking at the matter from a general standpoint, we see that there are probably many causes of fever, such as the absorption of some substance from a wound, or it may be the result of the presence of some ptomaine or some form of low organism in the system. Where we are able, as is probably the case in intermittent fever and in rheumatism, to do something to treat the cause of fever, the results are often highly gratifying,—on the other hand, when we are not able to do more than treat the symptoms of fever by means of an antipyretic, the results are chiefly a relief from the conditions of fever for a time. However comforting this may be to the patient, we should remember that it is purchased in the case of antipyretic drugs only by employing substances which are capable of acting in a way to seriously depress the efficiency of the heart, blood or nervous system. Further, they may diminish the patient's strength, and this may be noticed, either immediately with the result of marked depression, or later by the remote effect of rendering the convalescence unusually long and tedious. In other words, when we can promise relief only by reducing the temperature for a time, promoting sleep or

lessening delirium, we should bear in mind that the means used to accomplish such results ought to be adopted with great care, as their action is enfeebling.

In the administration of many drugs, notably the modern antipyretics, a point which is sometimes lost sight of is the stage of the disease and the condition of the patient aside from the temperature. For example, in the early stages of typhoid fever one would be justified in giving a dose of an antipyretic that in the later stages would be wholly unsuitable, owing to the reduced strength of the patient.

It seems proper to consider also the result of antipyretics on convalescence, and consider if our treatment has put the patient in a condition to regain his health less promptly than if he had not been subjected to the action of these remedies.

Aside from the antipyretic use of these drugs, it seems to me that it is important for the profession to discourage the careless use of some of these synthetical compounds for the relief of headache, especially by women; it is now quite customary for women to take "headache powders" without medical advice in large doses, and to prescribe the same for their friends.

Among the advantages which may follow the discovery of a large number of these compounds is, that we may find another drug which will be a specific in some condition, just as quinine is for intermittent or the salicylates for some forms of rheumatism. We may also be enabled to look at the pathology of fever from several standpoints, and thus gain more light upon the whole subject.

Antipyretics, including cold, are most serviceable in diseases where the high temperature continues for a long time, and their use should be begun early in cases where the symptoms call for them. It is well to bear in mind that it is unnecessary to keep the temperature down all the time by the continued use of antipyretics; we may accomplish the best results in many cases by having a remitting temperature, and resting satisfied with an interruption of an otherwise continued pyrexia.

The advantages which the application of cold has as a means of reducing temperature, and one of the reasons for the greater safety of cold above other antipyretic means, is that we are able to adjust the dose to the patient's condition; its action is more within our control, as it may be applied in

any amount varying from a sponge bath to a cold bath. Of course one may get symptoms of depression from cold if the amount is out of proportion to what the patient can bear.

In this connection it is interesting to recall some of the directions given by Hippocrates for the use of the cold bath in fever. "Sometimes the bath must be less used than it would be otherwise, from the want of accommodation; for in few families are all the conveniences prepared and persons who can manage them as they ought to be, and if the patient be not bathed properly he may be thereby hurt in no inconsiderable degree."

"There must be a short passage to the basin, and it should be easy of ingress and egress." "But the person who takes the bath should be orderly and reserved in his manner and should do nothing for himself."

". . . . Such are the benefits to be derived from the bath, if all the proper requisites be present, but if one or more of these be wanting, the bath, instead of doing good, may rather prove injurious; for every one of them may do harm if not prepared in the proper manner." "Neither must we bathe those who are debilitated nor such as have nausea or vomiting."

DR. J. W. GOODELL, of Lynn:—After practising medicine for something over thirty years, I cannot hastily admit the high value of the new antipyretics, neither of the old. I do not expect to see speedy dissolution follow if the temperature holds up to 102° or 103° for any considerable portion of the day. I do not consider a temperature of 103° of any imminent danger *per se*, and as a usual thing the temperature is lowered quite as much, and more satisfactorily, by the combined effects of stimulants and carminatives, as by the "*knock-down*" effect of a large dose of the new antipyretics. Especially is this true when the high temperature is caused by nervousness, and not by destructive inflammation.

My methods of treating typhoid fever have always been expectant, with good nourishment and plenty of bathing, remembering the advice given by Prof. Alonzo Clarke, in his lectures: "Gentlemen, when you are caught in a storm at sea, it will be much better for you to use your energies in keeping your craft upright and headed in the right direction than to attempt to still the storm." We hold that

conservatism in the use of drugs *is safe*, and especially of *new drugs*.

DR. W. A. MORRISON, of Boston :—Phenacetine, as an antipyretic and antineuralgic, has proved itself to be a most efficient remedy. Its beneficial results have been observed during the last ten months at the Boston City Hospital in the following number of cases :—Typhoid fever, 110 ; Neuralgia, 126 ; Rheumatism, 44 ; Phthisis, 17 ; Pneumonia, 14 ; Measles, 12 ; Erysipelas, 10 ; Tonsillitis, 9.

In all of the above instances phenacetine was administered repeatedly in doses of from five to thirty grains. Several cases of headache have been relieved in an hour by a single dose. The drug seems to be as efficient in neuralgia as in febrile diseases, and it is preferable to antipyrine on account of its freedom from danger. In typhoid fever phenacetine (dose five grains) will reduce the temperature from one to three degrees generally within one to five hours, but a larger dose is often necessary to gain the same result for a longer period. Lowering of the temperature is generally accompanied by profuse sweating. In several long-continued cases, after repeated doses of the drug, great prostration, weak pulse, marked chill and excessive sweating followed. Cyanosis was noted in one case only, the patient having suffered repeated relapses, and it was found necessary to substitute other antipyretics. In three cases only of those here reported did chills occur after the use of phenacetine.

Phenacetine seems contra-indicated in the following conditions :—old age, weak heart, pulse above 120° and feeble, and after copious hæmorrhage from intestines as in typhoid fever. The slight blueness of lips noticed among men who work in aniline is attributed to chemical combination of aniline with the blood, and is therefore not supposed to be a true cyanosis, due to impaired circulation.

DR. J. O. WHITNEY, of Pawtucket, R. I. :—The best antipyretic in pneumonia I have ever found has been venesection. I consider the use of the lancet at the right time and in proper cases of far greater value than these new remedies. I would emphasize also the value of aconite in fever, and think it far less dangerous and in the end more satisfactory than these new antipyretics, though in treatment of pneumonia it cannot in any way compete with venesection.

ARTICLE XXIV.

A STUDY OF MALARIAL FEVER IN EASTERN MASSACHUSETTS.

By CHARLES H. COOK, M.D.
OF NATICK.

READ JUNE 11, 1889.

A STUDY OF MALARIAL FEVER IN EASTERN MASSACHUSETTS.

UNTIL within the last four years intermittent fever, as an epidemic, was unknown in Eastern Massachusetts. Since the summer of 1885, it has prevailed, to a greater or less extent, in at least twenty-two cities and towns,—not counting places where there have been sporadic cases,—in the counties of Middlesex, Norfolk and Worcester; chiefly, however, in Middlesex county.

The geographical distribution of the disease is very interesting, when considered in connection with the following statement by Dr. Stimson (quoted by Dr. Holmes in his Boylston Prize Essay) in his memoir of Hopkinton in the Historical Collections :—"This town is situated thirty-two miles westerly from Boston. There are two ponds in the town, from one of which issues one of the extreme branches of the Concord" (now the Sudbury) "River, and from the other, one of the extreme branches of the Providence" (now known as the Blackstone) "River. One of the extreme branches of the Charles rises in its southerly part." . . . . "Before the swamps were cleared and drained, the inhabitants used to be subject to the *fever and ague;* but since, there have been no complaints of that kind in the town."

If we study the locations of the twenty-two towns and cities before referred to, we find that they are situated on some one of the three streams which have each a branch rising in Hopkinton. On the Charles river the disease has prevailed in Milford, Bellingham, West Medway, Sher-

born, Dover, So. Natick, Wellesley, Needham, Dedham, Newton, Weston, Waltham, Watertown, Brighton and Cambridge,—cases in the vicinity of Fresh Pond. (No returns have been received from Franklin, Norfolk, Medfield and West Roxbury.)

On the Sudbury river malaria has prevailed in Ashland, Framingham, Wayland, Sudbury and Concord. On the branch emptying into the Blackstone river it has appeared in Hopedale, but not in Mendon and Blackstone so far as I have been able to ascertain. In the latter towns, however, the villages are not situated on the stream in question. It has been quite prevalent in Hopkinton, the source of these three branches.

It has not appeared in Bedford, Carlisle, Chelmsford, Billerica and Lowell,—towns situated on the Concord river,—which river is formed by the junction of the Assabet and Sudbury rivers at Concord. Neither has it gone up the Assabet from Concord to any extent, since only Maynard and Hudson report any cases,—the former, *one*, as originating there,—the latter, "several well-marked cases during the past two years;" while Acton and Stow claim immunity; Marlboro', Northboro', Westboro' and Worcester, all situated northerly and westerly from Framingham and Hopkinton, have been free from the disease.

Of the towns near, but not adjacent to these rivers, Hyde Park reports that "we have some affections which have of late been attributed to malarial influences," and a physician in Bedford, which is on the Concord river, writes: "I have not had a *true case* of intermittent, but I have had several cases that took on an intermittent character at some time during the fever. Most of the cases appeared in 1887–88; some in Lexington and part in Bedford." In Quincy, "there have been several sporadic cases within the past four years," and "malaria, not distinctly

intermittent fever, has appeared to be an element in the cause of many cases of sickness."

Clinton, Leominster and West Boylston, on the Nashua river, report entire freedom from the disease, and the same is true of Arlington, Lexington, Brookline, Jamaica Plain, Milton and Foxboro', while Braintree reports "three or four cases in the last few years," and Walpole a few cases, but no prevalence of the disease. It is very evident from the returns thus far received, that, as has been already stated, intermittent fever as an epidemic, or even to any extent, has been confined to those streams which have each one of them a branch from Hopkinton, a town where, in the early part of this century, "fever and ague" was indigenous.

Is this only a coincidence?

Who will answer the question?

After this brief and very imperfect survey of the field in general, it may be of interest to study more in detail some features of the epidemic in two or three towns, especially Framingham and Natick.

In South Framingham, in the summer of 1885, intermittent fever made its appearance as an epidemic, and it has prevailed in that and other parts of Framingham until the present time.

In the summer of 1886 it appeared in that portion of Natick familiarly known as the "West Part," a locality west of Natick village, and also west of Lake Cochituate and Lake Cochituate reservoir. Very soon it became more or less prevalent in other parts of the town, especially in Felchville and on "Nebraska Plain."

I quote from Dr. Z. B. Adams's very interesting paper[1] on Malaria in Eastern Massachusetts, read at the annual meeting of this Society in 1886, a description of the

[1] Med. Comm. of the Mass. Med. Soc., Vol. XIII., No. V. 1886, p. 615.

physical characteristics of the malarial region in South Framingham :—

"The soil of South Framingham is a sandy loam of little elevation, resting upon an extensive bed of quicksand, which underlies all of the adjacent country, and is of varying depth and indefinite extent. This quicksand everywhere contains water, so far as known.

"On the south and east of the village lies a wide swampy region of some three hundred acres in extent, called Guinea meadows, constituting the water-shed of Beaver-dam brook, a stagnant, obstructed stream, which empties into Lake Cochituate. These swamps, which are partly wooded, are composed of a retentive peat, spongy, and in some places of great depth. Into this bog the sewage of the village filters, or is led by means of ditches and drains."

Beaver-dam brook, which drains the Guinea meadows and empties into Lake Cochituate, flows through West Part, where malaria first found a foot-hold in Natick. The soil of this locality is also a sandy loam, with a subsoil of clay, and, very probably, quicksand near the Framingham line.

That portion of Felchville where malaria has been most prevalent, drains by gravity into a hollow south and west of the village. Just across this hollow lies "Nebraska Plain."

The soil in Felchville is gravel with a subsoil of clay; that of Nebraska Plain is gravel, with a subsoil largely of sand. The latter has an elevation of twenty to thirty feet above Lake Cochituate.

Attention is here called to the fact,—is it only a mere coincidence?—that the malarial districts in South Framingham and in Natick are either closely connected in some way with marshy places which receive sewage drainage by gravitation, or else are upon a stream which drains such a locality. In connection with this may be mentioned another interesting fact. About seventeen or eighteen years ago

the Boston Water Board built several settling basins on Pegan brook, near its junction with Lake Cochituate, for the purpose of intercepting, so far as possible, the solid matter of various kinds which, through many channels, found its way into this brook. In the summer of 1888, these dams were taken away, the solid matter at the bottoms of the basins removed, and the banks were gravelled. At no time, neither before the dams were removed nor while the work of excavating was going on, was there any outbreak of intermittent fever, either in the immediate vicinity of these basins or in that part of Natick village situated in the course of the prevailing winds from the direction of these basins.

As has been already stated, malaria, *as an epidemic disease*, was unknown in Eastern Massachusetts until 1885. The opportunity thus afforded for a study of its natural history as influenced by the direction of prevailing winds, variations of temperature, mean temperature, rainfall, and barometric variations, far surpasses that which is afforded in a section where it has always prevailed.

It is greatly to be regretted that the physicians in the cities and towns where it has appeared, have not from the first kept accurate records of the dates and locations of the cases which came under their care. Had this been done there would have been available a mass of invaluable material for the study outlined above.

Through the kindness of physicians in Framingham and Natick, who, at quite an expense of time and labor, have looked through their records for these years, material has been collected sufficient for an interesting analysis of over six hundred and fifty cases.

For greater convenience in the study of these cases, as related to rainfalls, they have been divided into four classes :—

I. Where there was no rainfall for at least six days before either an out-break or a marked increase in the number of cases, and no rain during the out-break. (All cases which developed while there was less than half an inch of rain are included in this class.)

II. Where there was rain at some period six days before, but no rain during the out-break.

III. Where there was no rain before, but rain during the out-break.

IV. Where there was rain both before and during the out-break.

	Year.	No. Cases.	Per Cent.	
Class I.	1886 1887 1888	66 91 115	40 39½ 44	No rain either before or during the out-break.
Class II.	1886 1887 1888	60 60 75	36½ 26 29	Rain before but none during the out-break.
Class III.	1886 1887 1888	29 16 49	17½ 7 19	Rain during but none before the out-break.
Class IV.	1886 1887 1888	9 63 20	5½ 27 7½	Rain both before and during the out-break.

Note.—In the preparation of this and the following tables, the writer was very kindly allowed free access to the meteorological records of the Rev. Daniel Wight, of Natick.

Table showing Average Monthly Rainfall from April to October for 1885–88, compared with the monthly average for the ten years 1873–82.

	April.	May.	June.	July.	August.	Sept.	Oct.
1873–82	4.24	2.61	2.87	3.48	4.14	2.59	3.51
1885	5.08	3.89	**2.31**	**1.71**	5.70	**1.63**	5.00
1886	**1.70**	2.90	**.91**	**2.87**	**3.53**	3.35	**3.18**
1887	**4.04**	**.87**	**2.27**	**3.23**	**3.38**	**.98**	**2.36**
1888	**3.02**	3.95	**1.71**	**1.20**	6.68	9.88	4.41

Figures in heavy type indicate the months in which the rainfall is *below* the average.

These months are selected because they are the months in which intermittent fever was most prevalent.

Out of the 28 months here tabulated, in 18 the rainfall was *less* than the average, and in 10 it was *more* than the average.

Table showing the Average Monthly Temperature for each of the years 1885–88, and also the ten years from 1873–82.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1873–82	24.73	26.31	33.76	44.61	57.46	66.67	71.53	69.40	62.36	51.80	37.50	29.03
1885	**24.55**	**17.81**	**26.03**	47.19	**54.56**	66.92	72.01	**66.72**	**58.97**	**49.35**	41.08	30.06
1886	**22.74**	**24.04**	**32.95**	49.07	**57.23**	**64.29**	**70.76**	**68.23**	**61.33**	**49.40**	40.12	**25.19**
1887	**22.33**	**26.17**	**29.66**	**43.28**	60.66	**66.01**	74.80	**66.23**	**57.35**	**48.68**	38.36	29.75
1888	**17.88**	26.49	**31.51**	**42.92**	**56.09**	68.77	**68.95**	69.61	**59.04**	**46.60**	42.43	33-39

Figures in heavy type indicate the months in which the temperature is below the average.

It will be noticed that in 1885, the year in which the intermittent fever became an epidemic in Framingham, the months of special prevalence, August, September and October, were colder than the average for 10 years; that in 1886, when it extended to Natick, the entire year, with the exception of April and November, was colder than the average for 10 years; and that April alone is an exception in the months of greatest prevalence. In 1887 May and July are the exceptions, and in 1888 June and August. It is worthy of especial note that from July, 1885, the beginning of the epidemic, to October, 1888, out of 25 months there are 19 which were colder than the average.

Table showing the monthly Barometer Averages for the four years 1885–88, in which Intermittent Fever has prevailed, compared with the averages for the four years 1881–84, and also for the four years 1877–80.

	APRIL.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.
1877–80	29.839	29.939	29.914	29.916	29.924	30.037	30.006
1881–84	29.853	29.955	29.928	29.900	**29.996**	30.027	**30.068**
1885–88	**30.000**	**29.998**	**29.956**	**29.954**	29.949	**30.066**	29.989

The months having highest barometer are indicated by figures in heavy type.

Table showing the monthly Barometer Averages for the four years 1885–8, compared with the monthly averages for the ten years 1873–82.

	APRIL.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.
1873–82	29.826	29.935	29.904	29.918	**29.957**	30.017	29.977
1885–88	**30.000**	**29.998**	**29.956**	**29.954**	29.949	**30.066**	**29.989**

It is a fact worthy of note, even though it may be of no practical importance, that it is shown by the first table that the barometer ranged *higher* every month but August and October for the four years of the epidemic, when compared with the preceding groups of four years; and it is shown by the second table that the range, during the years of the epidemic, compared with the ten years' average, was higher in every month but August.

Table showing Number of Cases, Average Temperature, Average Rainfall and Prevailing Wind for each of the seven months in the years 1885–1888, during which Intermittent Fever was most prevalent.

Year		APRIL.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.	TOTAL.
1885	Number of Cases.		5	5	10	31	39	13	103
	Temperature.	47.19°	**54.56°**	66.92°	72.01°	**66.72°**	**58.97°**	**49.35°**	
	Rainfall.	5.08	3.89	**2.31**	**1.71**	5.70	**1.63**	5.00	
	Prevailing Wind.	N.W.	**S.W.**	**S.W.**	**S.W.**	N.W.	**S.W.**	N.W.	
1886	Number of Cases.	18	31	35	33	89	53	31	290
	Temperature.	49.07°	**57.23°**	**64.29°**	**70.76°**	**68.23°**	**61.33°**	**49.40°**	
	Rainfall.	**1.70**	2.90	**.91**	**2.87**	**3.53**	3.35	**3.18**	
	Prevailing Wind.	N.W.	**S.W.**	**S.W.**	**S.W.**	**S.W.**	N.W.	N.W.	
1887	Number of Cases.	26	59	53	64	100	64	35	401
	Temperature.	**43.28°**	60.66°	**66.01°**	74.80°	**66.23°**	**57.35°**	**48.68°**	
	Rainfall.	**4.04**	**.87**	**2.27**	**3.23**	**3.38**	**.98**	**2.36**	
	Prevailing Wind.	N.W.	**S.W.**	**S.W.**	**S.W.**	N.W.	N.W.	N.W.	
1888	Number of Cases.	45	82	59	77	64	40	20	387
	Temperature.	**42.92°**	**56.09°**	68 77°	**68.95°**	69.61°	**59.04°**	**46.60°**	
	Rainfall.	**3.02**	3.95	**1.71**	**1.20**	6.68	9.88	4.41	
	Prevailing Wind.	N.W.	N.W.	N.W.	N.W.	N.W.	N.W.	N.W.	

(Framingham 1010, Natick 157, Wellesley 14.) Total Number of Cases, 1181.

Figures in heavy type indicate when temperature and rainfall are *below* the average for 10 years.

Table showing the Monthly Average for 10 years, 1873–1882.

	APRIL.	MAY.	JUNE.	JULY.	AUG.	SEPT.	OCT.
Temperature.	44.61°	57.46°	66.67°	71.53°	69.40°	62.36°	51.80°
Rainfall in inches.	4.24	2.61	2.87	3.48	4.14	2.59	3.51
Barometric Pres.	29.826	29.935	29.904	29.918	29.957	30.017	29.977
Barometric Pressure for years 1885–1888.	**30.000**	**29.998**	**29.956**	**29.954**	29.949	**30.066**	**29.989**

Figures in heavy type indicate when the barometric pressure is *above* the average for 10 years.

Table showing the different average Temperatures, for six days previous, at which Cases developed.

	Below 30°	30°—44°	45°—49°	50°—57°	58°—64°	Above 65°
1886	2 Cases	0 Cases	5 Cases	22 Cases	28 Cases	106 Cases
1887	9 "	7 "	4 "	23 "	69 "	118 "
1888	0 "	60 "	9 "	21 "	31 "	138 "
Total	11 "	67 "	18 "	66 "	128 "	362 "

A total of 162 cases with the temperature *below* 58°F.; 96 cases *below* 50°F.; 78 cases *below* 45°F.

Table of Cases developed when Temperature averaged Low for five days before.

YEAR.	MONTH.	NO. CASES.	AV. TEMP.	AV. FOR 27 DS.	CASES.
1886	Jan.	4	22.74°		
1887	Jan.	3	22.33°		
1887	April	26	43.28°	42.°	24
1888	Jan.	4	17.88°		
1888	April	45	42.92°	41.32°	41

On January 27th, 1887, a case developed in South Framingham,—Dr. Palmer's child,—where the average temperature for the day was only 8° F.; the morning temperature was –3° F.; the average for the 6 days before was only 35.11° F.—a fall of 19° F. during the night; 1.85 inches of rain the 24th–26th, and 3 inches of snow the 26th.

Table of Cases as related to Winds. Number of Cases under different prevailing Winds.

	N. W.	S. W.	N. E.	S. E.	N.	W.
1886	62	67	10	25		
1887	144	58		14	18	
1888	120	73	41			25
Total	326	198	51	39	18	25

Table of Cases with either a marked Rise or Fall of Temperature in the 24 to 48 hours preceding.

	No. Cases.	Rise.	No. Hours.	Fall.	No. Hours.
	5	12°	24		
	2			11°	24
1886	15			10°	48
	6	16°	24		
	5			23°	24
	4	10°	48		
	2			21°	48
	3			11°	24
1887	4	13°	48 followed by	17°	24
	19			13°	48
	14			11°	24
	9			12°	48
	6			10°	48
	6	12°	24		
1888	42			10°	24
	18	15°	48		
	6			13°	24
Total	Cases. 166	Rise. 43.		Fall. 123.	

In the early part of this paper it is stated that over six hundred and fifty cases were analyzed, yet on the printed slips the total number of cases is given as one thousand one hundred and eighty-one. This apparent discrepancy arises from the fact that the day of the month was given in not far from six hundred and fifty cases, while only the *month* was given in the remaining cases,—hence these last could only be used in the tabulations by months.

SUMMARY.

1. That the disease seems thus far to have been limited to the cities and towns along the Charles and Sudbury rivers, and the branch of the Blackstone.

2. That it seems to have travelled to the *East* rather than to the *West*, *i.e.* in the direction of the prevailing winds, rather than against them.

3. That it seems to have developed and increased in seasons *below* the average temperature equally well as in those above.

4. That some of the marked out-breaks occurred in cold and wet periods, as well as in hot and dry seasons.

5. That an "essential," as given by at least one authority, viz., that there must be an average temperature of at least 58° F. for twenty-four hours to *develop* the disease, does not hold good in this analysis; neither does another "essential" of an average temperature of at least 65° F. for twenty-four hours to produce an *epidemic*.

6. That it seems to prevail more extensively in regions near wet and marshy localities than in regions near shallow bodies of water, even though the water has been the depository of sewage for years.

7. That the marshy and wet places where it has prevailed most, have received sewage drainage either by sewers or by gravitation.

While I would not presume to say that any of these facts are conclusive, yet I trust it is not too much to claim that they are suggestive.

DISCUSSION.

Dr. S. W. Abbott, of Wakefield:—Dr. Cook's paper has additional value from the carefulness with which it has been drawn up, from the fact that groups of cases always have a definite value in the study of the history of any disease. I would discuss the subject more in the line of prevention, than of therapeutics; prevention in the broad sense of the word, in the sanitary sense, and not in the line of mere prevention by the use of quinine or other remedies, after the malady has occurred in the individual. I do not know that we can call malarial diseases communicable; but they are in a certain sense infectious. They are also to a certain degree preventable.

In order to understand the question of prevention, we must know the history and causes of any disease. We know more of the history of this disease in Massachusetts than of its causes. Its appearance in this State has been spasmodic. Dr. Holmes's admirable treatise on the subject shows this. He says that in the first century of the history of the colony there was but little known of it. In the second its occurrence was more frequent, perhaps more frequent than the increase in the population would warrant, and there is, perhaps, only one place in the State where it may be said to have a continuous history of twenty-five years at one time. I mean the lower part of the Housatonic valley.

In 1879 and '80, it became prevalent at Lenox and Pittsfield, extending up into the valley of the Hoosac in the neighborhood of Cheshire, and as far as North Adams. In the Connecticut valley, there were cases at Springfield, Holyoke, Northampton and other towns. In 1885 occurred the epidemic at Framingham, extending to Natick in the following year. Then there was a local epidemic in the town of Deerfield, beginning in 1886, including two hundred cases, which for the population in Deerfield was a very large number. There are certain points in regard to these towns

that have something in common. The majority of cases, I might say 90% and more, were in the neighborhood of bodies of water. They are slow flowing rivers, stagnant waters, marshes, meadows and swamps. At the malarial trial at Lenox on account of the Smith Paper Company's dam, it appeared that nearly all these cases were within a distance of less than one mile from the reservoir, extending some three miles back into Pittsfield, and some along the Cheshire reservoir. These are not natural bodies of water. They are artificially produced by damming streams.

There is a good deal of shallow flowage at Framingham and Natick. I do not say that they are causes, but they are conditions to be considered. We know the conditions of its appearance better than twenty-five years ago. One of the best American observers, Dr. Smart of the United States Army, has given in Wood's Reference Hand-Book, an excellent paper on the subject of malaria. Of course, we must recognize the value of German and Italian observations. Italy is the most malarial of European countries. Three conditions accompany the appearance of malarial troubles: heat at a continued temperature of 60° F., moisture, decaying vegetation, and conjoined with these a probable biological factor. In temperate climates, low grounds, marshes and places subject to overflow afford factors favorable to its evolution. It may occur on dry soil, but is it not true that in the dry soil and near the surface, moisture often exists?

There is one statement in the article by Hertz, in Ziemssen's Cyclopædia of Medical Practice, which seemed to me to foreshadow some of the conditions that Dr. Cook has mentioned in this neighborhood, and they were written in 1873 or '74, not more than ten years before the occurrence of this epidemic at Framingham. He says, "In case of the working over or turning up of the soil, as in building dykes and viaducts, in rooting out timber and preparing the virgin soil for cultivation, organisms are brought to the surface, and not only the laborers engaged in such enterprises, but the inhabitants for miles around, are liable to this fever." Those conditions were certainly met with in South Framingham. Dr. J. F. A. Adams described this accurately by the term "tender exotic." It is occasionally

epidemic here in New England, but we can hardly call it endemic. It comes here only when the proper climatic conditions are to be found.

Another preventive has been proposed, and that is the Eucalyptus tree, which was introduced some fifteen or twenty years ago in Algiers and also in Rome, for the prevention of this disease. One theory of its action was that it was a rapidly growing tree; that the leaves would absorb much moisture, double their weight in twenty-four hours, taking that amount out of the soil. Others believed that an essential oil obtained from the tree had a disinfectant action. A colony of monks planted eleven varieties of these trees. Tommasi Crudeli says, however, that in 1882 every one of the monks was attacked. The theory was abandoned, and but little has been said about it since that time. The account may be found in the "Practitioner" of 1879, '80 and '81. Crudeli goes on to say that "The conditions essential to a permanent improvement of the soil, are those of so modifying its physical conditions and chemical composition as to render it incapable of producing the malarial ferment." "The malarial poison is due to an organism which multiplies in the soil."

Several micro-organisms have been associated with this disease. Salisbury of Ohio made many observations in 1868, and claimed that he had discovered the malarial germ. In 1879 the bacillus of malaria was observed by Klebs and Tommasi Crudeli, and a year or two afterward an entirely different one by Laveran.

Tommasi Crudeli states more definitely the chief conditions necessary for its appearance: a temperature not less than 60°, a moderate amount of permanent moisture in the soil, and a ready access of oxygen to the strata that contain the ferment. The first is wanting in winter, the second is wanting in summer when we have prolonged seasons of drought and heat. If the malaria is due to moisture and heat, our efforts must be to remove the moisture by drainage. We cannot remove the heat. There is an instance in illustration in the town of Deerfield already alluded to. There was an epidemic there of two hundred cases in two years. There is a ditch running from the town a long distance towards the north to drain a portion

of the town. This ditch became filled with grass and the drainage became imperfect. I understand the town authorities are at work upon it, and it may improve the condition of the town.

One other question is the possible effect of sewage. Does it have anything to do with the production of malarial fever? I mean sewage as distinct from drain water. We generally speak of drainage as drainage for water. Sewage implies dirty water and water that generally contains fæcal evacuations. We do not have any evidence that malarial troubles are caused by what we commonly call filth, but rather by moisture, and that moisture may be clean water, or water free from household sewage.

DR. J. F. A. ADAMS, of Pittsfield:—Berkshire county is now practically free from malaria. The late epidemic began in 1874, was at its height in 1880, and little has been heard of it since 1884. The foci of the poison were the mill ponds and the meadow lands adjacent; while the hills were nearly exempt. For example, the village of New Lenox, with a population of eight hundred, had three hundred and fifty-three cases of intermittent fever between 1878 and 1882, while hardly a case occurred at Lenox, two miles away and two hundred feet higher. Intermittent fever was most prevalent in dry seasons, when the water was low, and a large area of mud flats exposed to the sun.

An interesting study, in connection with this epidemic, is the apparent modifying influence which the malarial poison exerts upon typhoid fever. During the malarial epidemic, typhoid fever was unusually rare in Berkshire, but became gradually more prevalent as malarial fevers disappeared. But with this re-appearance of typhoid, a marked change of type was observed, the cases being characterized by mildness, a low death-rate, frequent absence of diarrhœa, and an atypical temperature curve, the chief peculiarity of which is a very high temperature in the first week. These cases have continued to appear up to the present time, but in a diminishing proportion to the typical cases, which have increased while the others have decreased.

These atypical cases present every variation, from manifest typhoid, with some one symptom lacking, down to

cases having no symptom but pyrexia. Such cases were not unknown before the malarial epidemic, but were far less common than they have been since. Similar cases have been reported by medical writers in various parts of the United States, especially in those where malarial fevers prevail. They have recently been well described by Drs. Atkinson, of Baltimore, and W. W. Johnston, of Washington.

Very similar cases have come under my own notice in Florida, where are found intermediate forms between remittents and a fever closely resembling typhoid. Such cases sometimes begin and end as an intermittent or remittent, with a continued fever between which takes on more or less of the typhoidal character. Between a continued malarial fever, if such a thing really exists, and the atypical form of typhoid, the diagnosis is not very easily made. Aside from the temperature curve, which we have seen to be variable, we have no gross test except the effect of quinine. More delicate diagnostic measures, not easily adopted in private practice, are Ehrlech's test and the microscopic examination of the blood.

Practically, in this State, it is safest to class as typhoid all cases of continued fever, no matter how free from typical symptoms, for such cases frequently develop unexpectedly severe typical symptoms, such as hæmorrhage or even perforation.

Dr. J. O. Whitney, of Pawtucket, R. I.:—Malaria has existed in the valley of the Blackstone river below Woonsocket Falls for eight or ten years. It exists there to-day. I live at Pawtucket, where it is estimated that last year there were two thousand cases out of a population of twenty-four thousand. There has been no change whatever in the water courses for fifty years. There has not been a new dam below Woonsocket Falls to my personal knowledge for forty-five years. In a portion of the city of Pawtucket, a mile from the centre, is a place called Hammond's Pond. The people who live in that vicinity have malaria most intensely. It starts from Providence and extends to Albion.

I was around Framingham and know that relatives of

mine suffered from the disease. In houses with damp cellars I believe malaria is most liable to occur.

Aiken says: At New Orleans they have yellow fever, at St. Louis they have intermittent, and in the upper waters typhoid fever. He recognized but one poison, call it what you please. I think with Aiken that it is one and the same cause, modified only by the heat at New Orleans, and by the cold at St. Paul. But they have yellow fever at one place and typhoid at the other.

DR. J. R. BRONSON, of Attleboro':—In the village of Hebronville, in the town of Attleboro', until the autumn of 1880 I did not see a case of intermittent fever. As Dr. Whitney has said, there has been no change in the streams since 1841. In that very locality where the initial case occurred, during the autumn when the streams were unusually low and a large amount of mud was exposed, there were cases of intermittent fever. I am told that last year cases were very numerous there. I believe too we have had less typhoid fever than we usually have, and it is milder than that which antedated the inception of malarial fevers.

DR. W. E. SMITH, of Boston:—Previous to 1887, I was a resident and practised in Framingham, so that I was there during some of the epidemic of malaria. The Boston basins had been built and been in active operation some six or seven years previous to the outbreak of malaria in South Framingham; but they are three miles from this outbreak, so that a probable connection between them and the outbreak is obscure. Before, however, there had been a case of malaria reported in Framingham nothing was more common than to notice a changed condition of the atmosphere. There was a chill and a dampness in the air which had not been noted before the basins were constructed. At the same time, as Dr. Z. B. Adams records in his paper a few years ago, all the conditions usually considered favorable to an epidemic of malaria had been in constant existence in the basins, and yet no outbreak had occurred previous to 1885. Another fact was that a large area of swamp land (the Guinea meadows mentioned by Dr. Cook), lying to the southwes

of the village of South Framingham, was completely burned over only a few months previous to the outbreak of malaria, and it would seem not improbable that an avenue was thereby opened for the miasm to be blown in from this swamp land to the village, especially since it will be observed by the tables that the wind was S. W. at the beginning of the outbreak.

A somewhat similar condition of affairs was present at Framingham Centre, where, however, the outbreak was not so severe. A few years after the reservoirs were built, a large tract of woods was cut down to the west of the village, between it and the basins, exposing here also a swamp, though of much smaller area than the Guinea meadows. At present both swamps are again thickly overgrown. At the same time the basin to the west, beyond this swamp, was drained off just before this outbreak, exposing the mud bottoms to the summer heat; and as before noted, the prevailing winds were S. W. There have also been cases in Framingham Centre on Normal Hill, far above the Sudbury river or other streams, but the hill is full of springs and has a very wet soil.

Dr. Cook alluded to imperfections in the data of the disease during the outbreak of 1885. There were several reasons at that time for the large number of reported cases apart from the actual occurrence of the disease. It is probable, for example, that some cases were reported more than once, and perhaps under the circumstances unavoidably reported. The disease was a new one to the people, and at first they were naturally somewhat alarmed. They would have one practitioner give them a dose of quinine and the attack would pass away. If the chills returned, distrusting sometimes the first practitioner, they would call in a second, and so that case would be reported twice or three times. The disease is now I believe on the decline, according to medical reports, although it is possible that more cases now treat themselves without calling in a physician than in former years.

Although I believe in the influence of marshes over the disease, yet it is a fact that malaria began to appear in the northern part of the town, where the land is higher and marshes not so near, at a much later period than it appeared

in the two villages mentioned. And there has been during the last three or four years an immense activity in cutting down the woods all through the north part of Framingham. Indeed, it seemed to me last week while revisiting this district, that to accomplish all the work that has been done, the axes must have been busy three hundred and sixty-five days in all the three years since I removed from the town. I do not say positively that this destruction of the woods has caused the outbreaks of the disease, but I do think it reasonable to consider that it may have had an influence upon both its causation and its spread.

This whole question of the influence of the forests upon disease has received little attention hitherto from medical men, but it ought to receive much more. A case in point was related to me last summer by Prof. Fernow, United States Chief of Forestry. The town of Abingdon, Maryland, had been entirely free from malaria until a forest between the village and the river had been cut down. Immediately a severe epidemic infested the place. The case is certainly an interesting one, and I wish it might encourage us to give the matter a little more scientific study in cases nearer home.

[illegible]

[illegible]

ARTICLE XXV.

ASEPTIC SURGERY.

BY

HERBERT L. BURRELL, M.D.

AND

GREENLEAF R. TUCKER, S.B.

OF BOSTON.

READ JUNE 11, 1889.

SOME PRACTICAL EXPERIMENTS IN THE DETAILS OF ASEPTIC SURGERY.

THERE is hardly a subject of greater practical interest to surgeons than Aseptic and Antiseptic Surgery. Like all principles of great importance it has passed through many changes; hot-tempered advocates have claimed too much, luke-warm opponents have belittled it.

It seemed to the writers that a contribution of an experimental inquiry into the practical value of the many details that have been introduced in this work would appropriately open the subject for discussion. Surgery has had come to its assistance the science of Bacteriology, and the information which it has furnished and will continue to furnish must greatly aid in the work of practical surgery.

The plan of work which we shall suggest may be changed as new information is contributed, but never will the full benefit of bacteriological science be realized until schools of medicine educate their students in this collateral science and surgeons become familiar, not alone with the principle, but the detail of the work.

The primary aseptic healing of wounds, prior to the advent of antisepsis, was by no means an unheard-of thing. Surgeon after surgeon would boast of how quickly his wounds healed. Fortune favored him by excluding or destroying the germs, no matter what dressing was used. Now came what he considered a new dressing, which he was loath to use from being an innovation. One detail after another has arisen, withstood the crucial test of experience and satire, and

again subsided; this will continue, but beneath this evolution of a method that has the fault, as we were told by a prominent practitioner, "of being so complicated and changeable that no one can follow it," rests, as the foundation which has never been shaken, the principles of asepticism and antisepticism; the fact, that pus in a wound means infection by germs and putrefaction. Although it is inevitable that further changes must take place in the development and application of the principle, we have attained surgical possibilities not dreamt of by our predecessors.

It is of course well recognized that a surgeon to-day should start with his instruments and materials aseptic, and yet how rarely do we see the surgeon and his assistants carry through an operation to the end aseptically. Constant vigilance and a thorough belief in the necessity of attention to little details is the price of gaining aseptic healing.

The principles of asepticism and antisepticism are perhaps well recognized, but it is the belief of the writers that only in a partial way is it appreciated that sources of contamination exist in operative work in every detail. If one wishes to have this success, he must believe.

Some of these sources we shall attempt to demonstrate.

The labor which would have been necessary to identify species in this work would have been stupendous; the sole idea influencing us, has been to find out whether each detail of the work would stand a bacteriological and clinical test.

The following details will be presented:

The Preparation of the Room for an Operation.
The Toilet of the Surgeon and Assistants.
Preparation of the Operative Field.
The Disinfection of Instruments.
The Disinfection of Sponges, Ligature, and Suture Materials.
Irrigation.
Dressings.

1st. *Preparation of the Room for an Operation.*

The subject of micro-organisms in the atmosphere is at the present time receiving considerable attention, and it has been found that their presence in the air of a room depends on the numbers present in the room itself, and that their absence is a measure of cleanliness.

This naturally calls for rooms which may be rendered bacteriologically clean. These are being provided in the newer hospitals.

A room filled with micro-organisms may be a source of infection, and to the private practitioner, who is liable to be called upon at any moment to do a laparotomy in the homes of the wealthier classes or the hovels of the poor, the preparation of the room is a matter of some importance. Directly bearing on this subject may be cited some experiments by one of us on the air of the Boston City Hospital.[1]

It was found in a series of "Night experiments" conducted in the wards of the hospital, that the air, when the room was free from any commotion, was also practically free from micro-organisms. In another series of experiments, entitled "Before and after Sweeping," it was found that after the first sweeping a large number of micro-organisms existed in the air; on allowing these to settle out and again sweeping, the numbers found in the air were comparatively small; after the third sweeping, very few micro-organisms were found. As Carnelly has aptly put it, "a room is a trap for micro-organisms," from which they can only be removed mechanically by the ordinary and extraordinary means of cleaning.

The practical application of these experiments is self-evident. The less commotion that exists in a room, prior to and at the time of an emergency operation, the better. This is quite apart from the usual housewife's custom. The removal of dirt from a room before an operation, would be

[1] Massachusetts State Board of Health Reports, 1888.

considered a matter of great importance, but really by sweeping, dusting and the removal of furniture we put the micro-organisms into the air, and thus render our patient liable to infection. Where time can be allowed for the preparation of a room, it should be freed from all movable objects, thoroughly swept, dusted, its floors mopped, walls sponged and only the necessities of the operative procedure allowed to be present in the room; in short, it should be freed from dirt.

In case of an emergency operation, nothing should be disturbed.

2d. *Toilet of the Surgeon and his Assistants.*

The most scrupulous care should be exercised in providing for cleanliness of person and clothing. From our standpoint all that is necessary to consider under this subject is the question of, "How shall the surgeon clean his hands?"

The following experiments were undertaken:

A man's left hand was selected, the nails cut, cleansed, the hand vigorously scrubbed with soap and water, washed with ether and immersed in a 1 to 1000 solution of corrosive sublimate; it was kept immersed for one hour, removed from the sublimate bath, washed with sterilized water and a layer of gauze placed on the front and back of the hand. These were saturated with sterilized, nutrient gelatine, and over this was applied an aseptic dressing. The man's right hand was then cleaned in the way a surgeon often does before an operation, *i. e.* by cleaning the nails of all visible dirt, scrubbing the hand with soap and water and immersing it for a moment in 1 to 1000 corrosive sublimate. It was rinsed with sterilized water and treated similarly to the left hand. A half hour later these dressings were removed and cultures made.

The left hand, which had been cleansed in an extraordinary manner by soaking in corrosive sublimate for one hour, was found to be absolutely sterile. The gelatine from the

right hand, which had been cleansed in the ordinary superficial way, showed colonies of bacteria, that from the back of the hand being completely liquefied, while that from the front of the hand was peppered all over with colonies.

The result was striking, and demonstrates that the ordinary method of cleansing the hands is ineffectual.

In this connection *nail brushes* were examined as an almost certain source of contamination in providing for an aseptic operation. Three brushes were taken which were used for general purposes. Bristles were snipped off from various parts of these brushes and cultured; all of them were contaminated with bacteria and moulds. As a remedy, it is suggested that hand brushes should be thoroughly cleansed after an operation and kept immersed in a 1 to 1000 solution of corrosive sublimate.

The result of the experimentation on hands is certainly striking.

It has long been recognized that corrosive sublimate will destroy all germs in a few minutes, and it certainly is possible, as the above experiments show, to gain asepsis of the hands if the surgeon or his assistants will take the time to gain it.

The superficial manner in which hands are treated is not fair to aseptic work. If it is to be done at all, it must be well and carefully done. The result will follow.

3d. *Preparation of the Operative Field.*

Wounds, to-day, should heal without pus; and one of the most important aids in obtaining this result, is to render the surface of the skin sterile previous to an operation. Here the fact should never be lost sight of that we have a living human organism to deal with, and not an inanimate object.

A patient approaches an operation with fear which is more or less controlled. Therefore unnecessary details of prepara-

tion, which may alarm his mind, should be banished. Proper protection should be taken for a rapid and effective operative procedure. Shock, that well recognized, but not clearly understood phenomenon, must always be borne in mind, and the patient should be kept warm and dry by suitably arranged rubber cloths. The operative field should be thoroughly cleansed by soap, water, shaving, ether, sterilized nail brush, corrosive sublimate—1 to 1000—and the mechanical removal of dirt, *i. e.* asepsis of the operative field obtained.

If it is possible to render the hands of the surgeon free from germs, it is equally possible to render the operative field sterile. So, in a measure, the experimentation has demonstrated that sterilization of the skin is simply a question of care and time to be exercised by the operator in cleaning his operative field.

The following experiment was undertaken. The house surgeon at the hospital kindly prepared a forearm antiseptically, as if it were to be operated upon, in the following manner:

The arm was cleansed with water, shaved, washed with ether, rubbed vigorously with a brush wet with 1 to 1000 corrosive sublimate, and an aseptic absorbent dressing was applied. This was removed on the fourth day and the successive layers after culture were found to be germ free. This shows that it is quite possible to render the surface of the operative field sterile. But it must be remembered that, while it is possible to remove and to destroy any micro-organisms that may rest on the outer surface of the skin, yet in its follicles, and possibly in its deeper layers, micro-organisms may exist which may be beyond our reach.

As has been said, the human organism may be considered as a vast, antiseptic machine, in which there is a constant conflict, as was pointed out by Virchow, between the cells and micro-organisms. If it were not for this power of the

living body, we should cease to exist. The destruction or inhibition of the cells gives to the micro-organisms an opportunity to gain the ascendency. Destruction of tissue, putrefaction and pus formation are the results.

The question whether wounds remain sterile after an operation will be considered under dressings.

4th. *Sterilization of Instruments.*

Surgeons have long recognized that instruments are a source of contamination in operations, and while it is customary for the operator to see that his instruments are clean and immersed in carbolic acid, yet this portion of the field of aseptic work has not, in the minds of the writers, received due consideration.

Let us present to you the condition in which we found instruments in a well-ordered hospital, where they were kept in glass-covered cases.

Instruments were taken at random from the operating cases and were cultured with the following results.*

Black Handled Scalpel	Hundreds of bacteria.
Keyes' Director	Completely liquefied.
Ivory Handled Scalpel	Colonies many hundreds.
S. Curved Catheter	Colonies " "
Bull Dog Forceps	Complete liquefication.

A pocket case of instruments was borrowed from one of the house officers and cultures were made of four instruments. The result was not unexpected. They were found to be covered with germs.

These instruments were not alone non-sterile, but the colonies found were multitudinous. This is the condition in which instruments exist, and what means have we for remedying this difficulty?

* In all cases where the term "liquefaction" occurs in this paper, we mean the presence of species (often putrefactive) which have the power of rendering solid nutrient gelatine permanently fluid.

The following experiment sheds light on the subject. Instruments were taken from a dish, from which they were about to be used by a surgeon for an operation; they had been cleansed and soaking for an hour in carbolic 1 to 40. The following were the results:

Burr Drill	2 Bacteria.
Metal Handled Knife .	Badly liquefied.
Dissecting Forceps . .	Completely liquefied.
Trocar	Badly liquefied.
Aspirator needle, prepared for use by ward master. Needle immersed in 1 to 20 carbolic	Bacteria 2.
Grooved Needle . . .	" 1.
Bull Dog Artery Forceps	Blank
Chain Saw	"

Bacteriologically, the instruments from carbolic were nearly as badly off as those that had been untreated.

Unfortunately corrosive sublimate, which is our most valuable germicide, is destructive to instruments, and it was hoped that in hydronaphthol, which is not harmful, we should possess a means of perfectly sterilizing instruments. It was found, however, with instruments which had been placed in an alcoholic solution of hydronaphthol—1 to 500—that the knife which remained in one hour was sterile. The bull-dog forceps that remained six hours gave liquefaction from the germs. This was a disappointment, for hydronaphthol ranks high as a germicide, and the desideratum of the surgeon is a fluid which shall quickly sterilize his instruments before an operation.

We have, however, certain methods of sterilization that have long been used in bacteriological laboratories, and have been found efficient for their work, namely, *heat dry or moist, interrupted or continuous.*

Interrupted sterilization, leaving intervals for the spores to develop, is bacteriologically a certain method of sterilizing instruments. But, unfortunately, it is impracticable for practitioners.

Continuous sterilization is quite effectual, and the following experiments of boiling, steaming and baking are interesting.

Instruments were *boiled* continuously in water for two hours and were then cultured, with the following results:

Bull Dog Forceps . .	Bacteria none, Moulds 2.
" " . . .	Blank.
Metal Handled Knife .	"

This experiment shows that in boiling we have a fairly efficient means of sterilization; but it is a well recognized principle in bacteriology that boiling, unless it is interrupted, is not an absolute means of sterilization.

As three instruments in the above experiment were about to be cultured after boiling, they fell upon the floor. The result is interesting, and is as follows:

One director	fell on the floor.	Bacteria 1, Moulds 8.
Grooved needle	" " " "	" 5, " 22.
Probe	" " " "	Complete liquefaction.

In each instance in which the instrument fell on the floor, micro-organisms were found to be present in large numbers. The lesson is self-evident.

The effect of sterilization by *steam* was next tried:—Instruments were taken from a dish of 1 to 40 carbolic, after they had been used in an operation, sterilized one hour in a steamer and cultured. The results were as follows:

Bull Dog Forceps . . .	Blank.
Wooden Handled Needle . .	1 colony, liquefied.
Large Probe	1 Mould.
Small "	Blank.
Bull Dog Forceps . . .	"
Dissecting "	"
Director	"

Again, six instruments were taken from the operating case, and steamed one hour. All showed occasional moulds; several showed colonies of bacteria.

This result is not satisfactory, and shows that the instruments were not perfectly sterilized by steaming.

Superheated steam was not experimented with, but it is claimed by competent observers that it is a rapid, certain method of obtaining perfect sterilization.

Baking was next tried, and while it was clearly recognized before experimentation that heat at 160° C. for a few hours gives certain sterilization, yet doubt was entertained as to the fate of delicate instruments.

Instruments were taken, wrapt in gauze, enclosed in a tin box, placed in a sterilizing oven and baked for one hour at 130° C. All instruments were found to be sterile. Again a number of instruments were taken with similar precautions, and baked at 160° C. for two hours. All were found to be sterile. In not an instance was an instrument injured by the heat.

The sterilization of instruments by heat requires intelligent supervision, and unless this is furnished, and the temperature is not allowed to rise above 150° C., instruments may be injured, as has been found when needles have been baked at a higher temperature.

Conclusion:—Until a proven certain, ready method of sterilizing instruments is presented, the baking of instruments, under the above precautions, at 150° to 160° C. for one hour, is recommended by the writers as a certain method of sterilization. The experimentation with hydronaphthol was not sufficient to invalidate its claimed advantages.

A large number of *needles* were cultured and found to be badly contaminated,—an average of fifteen bacteria per needle being found. This led the surgeons at the Boston City Hospital to discard needle-books, and all needles are now sterilized by baking in short test tubes plugged with cotton wool for one hour at 150° C. After sterilization the test tubes are kept, for better protection, in wooden boxes.

5th. *Disinfection of Sponges, Ligature and Suture Materials.*

a. Sponges. *b.* Ligature and Suture Materials.

Many operators have discarded sponges from operations, and use instead irrigation, or sterilized, absorbent gauze. This has been due to the difficulty experienced by practitioners in securing thoroughly clean sponges.

The sponges at the Hospital are thoroughly washed in running water, again and again, until all visible dirt is removed; they are then placed in a solution of permanganate of potassium, and allowed to remain about twelve hours; they are again washed in water and then immersed in a solution of oxalic acid, for a few hours.

This procedure not alone bleaches the sponges, but renders them very soft; after washing they are stored for use in a series of large stone-ware jars containing a solution of 1 to 40 carbolic acid, from which they are used in rotation.

Cultures were made from four sponges, just ready to be used in an operation. Three of them were sterile; one showed several colonies of bacteria and moulds. It was hoped that steaming sponges would completely sterilize them. A half dozen bleached sponges were taken, enclosed in gauze, and steamed for one hour. On their removal, it was found that the sponges had shrunken to one-fifth their original size, were hard as chips, and on placing them in water their absorbent power was found to have been completely destroyed.

Bleached sponges were immersed in 1 to 5000 hydronaphthol and kept for forty-eight hours. Cultures were made of these sponges and they were found to be sterile.

The treatment of sponges by prolonged immersion in carbolic solution, as above recommended, or a solution of hydronaphthol, seems to be the best method at present at our command. It is, of course, a matter of considerable

importance to be able to have sterile sponges, and it is believed that while the above method gives this result, in certain operations, for instance laparotomy, it is better to use Elliot's absorbent sponges, which are made by taking a small hank of Berlin worsted, doubling it on itself, and enclosing it in a gauze covering. Thus prepared they may be kept for use indefinitely, and readily sterilized in a corrosive sublimate solution.

b. Ligature and Suture Materials.

There is a current opinion prevailing among surgeons that cat-gut is difficult to sterilize. In almost every journal we are told of a new method for its sterilization.

A great deal of difficulty had been experienced from time to time, in the use of cat-gut, in the formation of stitch abscesses, and the following methods of preparing silk and gut were put to trial :—

The original silk is boiled for one hour and then wound off on glass spools, with sterilized hands, and kept immersed in a 1 to 1000 alcoholic solution of corrosive sublimate.

The cat-gut is prepared in the following manner :—

It is taken from the original bottles, which are filled with carbolic oil, washed thoroughly, the fat extracted with ether, and then with sterilized hands it is wound on to glass spools and immersed in a 1 to 1000 alcoholic solution of corrosive sublimate. Both silk and cat-gut are kept for a long time on the glass spools immersed in the alcoholic solution of corrosive sublimate. When needed for use, they are removed from the jar and placed in a ligature bottle specially devised for the purpose.

The original cat-gut, as taken from the carbolic oil, was cultured and found to show organisms in every case.

Eleven specimens of silk and gut were taken from their ligature bottles. The silk was found to be perfectly sterile,

while the cat-gut was found to have growths on all except the smaller sizes.

It is difficult to understand how germs can live that have been immersed in an alcoholic solution of 1 to 1000 corrosive sublimate, but it is suspected that the hardening of the cat-gut, prior to complete sterilization, shuts up within the substance of the gut a certain number of organisms, which remain latent until they are placed in living tissues, when the cat-gut swells, the germs are set free and stitch abscesses result.

Reverdin[1] reports a series of experiments in reference to the sterilization of cat-gut. He found that crude cat-gut, which had not been kept in fat to preserve it, which was exposed for four hours to a constantly increasing temperature, maximum 140° C., and then placed for a day in oil of juniper and kept in alcohol, was aseptic. This he had used clinically for eighteen months with perfect results.

V. Boret[2] has cultured the cat-gut preserved by Reverdin in bouillon, glycerine and sugar at different temperatures, and found that there was no reaction at the end of six weeks. Boret has tried the other methods of sterilizing cat-gut, and found that bacteriologically and clinically they failed.

Conclusion:—Small cat-gut was found, as ordinarily prepared, to be always sterile; large cat-gut, never. Silk always sterile.

As cat-gut is too valuable a material to be discarded, the writers would advise the method of Reverdin by heat, which is bacteriologically a good one.

There is no trouble about sterilizing silk.

6th. *Irrigation.*

The operator of to-day considers that, after using sterile instruments and materials in operating, at the end a

[1] Rev. Med. de la Suisse Rou, June, July and August, 1888.
[2] Ibid.

flushing off of the operative wound with a germicidal solution is all that is necessary.

For ordinary purposes a 1 to 2000 solution of corrosive sublimate is efficient for the sterilization of a wound before operation. 1 to 10,000 should be used during and after an operation. Great care should be exercised that none is retained within the wound.

For hydronaphthol, is claimed by competent observers, excellent results; but of this the investigators do not feel competent to judge. We would suggest, however, that taking high rank as it does, as an active germicide, and being non-poisonous and non-irritating, it deserves a trial.

Irrigator nozzles were suspected as a source of contamination. Four glass irrigator nozzles were taken from their rubber tubes and cultured. Two were sterile and two were non-sterile; one of these showed five colonies of bacteria.

Conclusion:—Irrigator nozzles should, therefore, be kept unattached and immersed in a 1 to 1000 corrosive sublimate solution ready for use.

7th. *Dressings.*

Some specimens of *rubber drainage tubes* were taken from the jar, in which they had been kept immersed in a solution of 1 to 20 carbolic acid, and cultured. They were found to be sterile.

Wounds, to-day, may be divided into aseptic and septic. Operative wounds, if properly treated, are aseptic; accidental wounds, more or less septic. For these two classes of wounds, two distinct dressings are necessary—aseptic and antiseptic.

At our command, we have, on the one hand, antiseptic dressings, such as carbolic, corrosive sublimate, iodoform and boracic acid. On the other hand, aseptic baked dressings.

In the Boston City Hospital boracic and iodoform gauzes are the antiseptic dressings used.

Baked dressings are the aseptic dressings used.

Samples of these dressings were cultured, and the antiseptic dressings were found to be non-sterile; the aseptic were found to be sterile.

The credit of introducing baked dressings, at least in this community, is due to Dr. H. C. Ernst, who, a number of years ago, suggested their trial at the Massachusetts General Hospital.

At the Boston City Hospital they are prepared in the following manner:—

Circular tins of various lengths and diameters, with long, close-fitting covers, are filled with bleached gauze cut into suitable sizes. These cans are placed in a sterilizing oven, and are baked at 150° to 160° C. for several hours.

Clinical experience with baked dressings has shown that they are quite unabsorptive. This is an objection, for what surgeons need is a sterile, absorptive dressing.

Of course an aseptic dressing prepared by steam is not open to this objection, but it is believed that the difficulties in preparing aseptic dressings by the method of steaming and the method of their protection after sterilization, are such that the baked dressings are more practical. We have overcome the non-absorptive quality of the baked dressings by saturating gauze with a 10% solution of glycerine, drying and subjecting it to sterilization.

The presence of the glycerine in no way interferes with the sterilization of the gauze at from 150° to 160° C. The result being a *perfect aseptic, absorbent gauze.*

A piece of ordinary baked gauze floats on water, while a piece of the aseptic absorbent gauze will immediately sink to the bottom.

Dressings were removed on the fourth day from wounds which had been dressed with iodoform and boracic acid

gauze. The inner layers of the dressings were found to be thickly peppered with bacteria, and the successive layers outward contained less and less.

It was found by experimentation with baked, aseptic dressings, which had remained in contact with a wound for anywhere from one week to a month, that the inner layers of the dressing, although the wound had healed completely without pus, were filled with bacteria.

Cultivating the successive layers of the dressing from the skin outward, it was found that No. 1 layer, which rested directly in contact with the skin, had a large number of germs. No. 2 fewer. No. 3 still less. Nos. 4, 5 and 6 still less. In the outer layers were found occasional moulds.

The presence of germs in the inner layers of these dressings was unexpected.

Where these germs come from, is not clear. They do not come through the dressing from the outside atmosphere, for it has been found that when the surface of the skin was sterilized, as if about to be operated upon, and an aseptic dressing was applied, it remained perfectly sterile, inner layer and all, at the end of four days. (*Vide* experiment operative field, page 558).

If the germs do not come from outside sources through the dressing, they must come from sources beneath the dressing.

In antiseptic dressings there are a number of reasons why this result may be expected: First, the antiseptics which are incorporated into dressings, with the exception of corrosive sublimate, are not germicides to be depended upon. Second, that they will inhibit the growth of germs is well known, but existing in the gauze as they do in a dry state, and too often in insufficient quantities, they are not in a condition to gain the results that otherwise might be expected.

The deductions to be drawn from the above are very evident:—

Where an antiseptic dressing is indicated, we should have in contact with the wound a moist, absorbent dressing, charged with an active germicide in sufficient quantities to be efficient.

This is probably best gained by applying a moist dressing containing glycerine, and charged with corrosive sublimate.

It must be understood that no attempt has been made to identify the germ, found beneath the dressings, *but, it can never be assumed* that the mere presence of bacteria is necessarily harmful until their pathogenic origin is demonstrated.

From clinical experience it has become evident to the writers, that with clean wounds in baked dressings we possess a very valuable dressing. They have been used at the Children's Hospital, in this city, for nearly two years, and by one of us, almost exclusively in one service, as surgeon to out-patients at the Boston City Hospital, and again for four months at the Carney Hospital. They have been used in one of the ward services of the Boston City Hospital for four months, and all have felt that the results were excellent.

Conclusions:—This experimentation teaches the important lesson, that, while it is a difficult thing to attain *absolute* asepticism, yet *practical* asepticism may be gained *by attention to details.*

That we have presented to you a practical way of sterilizing hands, an operative field, the instruments, ligature and suture materials and dressings.

That clinical experience, the touch-stone of experimentation, strongly testifies to this, that, although an operation cannot be made a bacteriological experiment, yet in the details of the antiseptic dressing of wounds, the principles

of asepticism and antisepticism should be carefully borne in mind.

That thorough cleanliness is a preventive of sepsis.

That germicides well applied, in sufficient quantities, will inhibit the development of septic germs.

That the surgeon *can* and *should* operate with thoroughly cleansed hands, thoroughly cleansed instruments, upon a thoroughly cleansed patient.

DISCUSSION.

Dr. F. K. Paddock, of Pittsfield:—A definition of the two terms, Asepsis and Antisepsis, I trust will not be considered out of place. Asepsis in its perfect form may be defined to be a condition of physiological health, with an absence of all conditions tending to induce putrefactive changes. Antisepsis comprises all the measures employed to secure a condition of perfect Asepsis. The instrumentality of germs in the promotion of putrefactive changes in wounds is so generally recognized by the profession, that evidence to confirm the theory is unnecessary.

Whether the septic influence of bacteria is inherent in the germs themselves, or dependent upon the animal alkaloids they generate in wounds, appears as yet to be undecided.

The problem which every surgeon tries to solve, is how to prevent the entrance of bacteria to wounds.

Fresh wounds in healthy subjects do not contain septic germs unless they are introduced in the process of making the wounds, and they do not require to be cleansed or bathed with lotions containing antiseptic agents to prevent suppuration. The best and simplest method of cleansing such wounds is by douching with pure water, sterilized by boiling, and not allowed to cool before using. The proper temperature is 110° or more. The heat contracts the capillaries, and prevents oozing. All antiseptic agents are more or less injurious to the tissues, and are liable to absorption. Unless a wound contains bacteria they are entirely unnecessary. Water sterilized by heat fulfils all the indications,

is not a foreign substance, and does not irritate the wound or poison the system.

During the last few years it has been demonstrated beyond reasonable doubt that there is a limit to the usefulness of antiseptic agents in the treatment of fresh wounds. It is certain that by absolute cleanliness alone bacteria can be excluded until the wound is closed.

The proper office of antiseptic agents is to sterilize and render aseptic the patient before and after the operation, the surgeon and his assistants during the operation using the sponges, ligatures, sutures and instruments that come in contact with the wound while exposed, and afterward to prevent the entrance of germs during the healing process. Instruments can be perfectly sterilized by immersing them in boiling water for five minutes immediately before an operation.

Undoubtedly germs gain entrance to wounds through the agency of minute particles of dust floating in the air. To remedy or prevent this, a room where an operation is performed should be as clean as possible; it should be divested of everything that is liable to contain fine dust. A room having a bare hard wood floor with painted walls should be preferred. The patient should be clean and fresh, both in body and clothing. The skin in the neighborhood of the proposed wound should be thoroughly washed and scrubbed, and, if necessary, shaved; following this, corrosive sublimate solution (1 to 1000) should be sponged over the surface. For small ligatures I use cat-gut, preserved in 10% carbolized oil. For large arteries and sutures, silk that has been immersed in boiling bees-wax containing 10% carbolic acid. For external sutures, in closing lacerated perineum, I employ boiled silk-worm gut. Great care should be taken to render needles aseptic, especially if they are used more than once. A very simple and sure way is to heat them in an alcohol flame; there is no other method so effectual in rendering the eye of the needle free from infectious germs.

Wounds that are of any size or depth should be drained by tubes which extend from their deepest portions, and externally their ends concealed in an abundance of antiseptic covering, so as to entirely absorb the discharge and exclude the air.

Sponges should be dispensed with, so far as practicable, in cleansing wounds. A stream of sterilized water from a douche bag can be substituted to advantage in many operations. Sponges, if used, should be perfectly cleansed by thorough washing of all extraneous material, and kept in tight jars of 5% carbolic solution.

Instruments with metal or hard rubber handles should be used. Such are more readily made aseptic than those having bone or shell handles. During an operation they should be kept in a tray and covered with 5% carbolic solution.

In regard to the preparation of the surgeon, practically very simple measures are required to insure asepticism. His clothing, hair and beard should be thoroughly brushed, so as to dislodge every particle of dust that is loose; he should wear a long, freshly laundried muslin or linen apron with sleeves; it should be fastened at the back and extend below the knees, so as to entirely cover the clothing of the body and the front of the thighs and legs. The hands and forearms should be thoroughly scrubbed with soap and water, using the nail brush unsparingly; finally, when dried with a clean towel, they should be bathed with sublimate or carbolic solution. The assistants should employ the same measures of cleanliness as the surgeon.

The more radical technique of preparation recommended and practised by some surgeons, consisting of a complete antiseptic bath, entire change of clothing, wearing India rubber boots, etc., for each operation, I consider unnecessary and often impracticable. These extreme measures, however, can do no harm, and of course should be resorted to rather than to take no precaution whatever. It is better to be unnecessarily careful than to neglect what is absolutely essential.

In conclusion, I wish to say that my preference for pure sterilized water in cleansing flesh wounds may give the impression that I do not appreciate the value of antiseptic lotions.

When, as frequently happens in the country, it is impracticable if not impossible to secure for the patient fairly good aseptic conditions and surroundings, I consider the use of antiseptic lotions safer than to depend entirely on

simple sterilized water to insure asepsis of a wound during an operation; corrosive sublimate solution (1 to 2000) or 2% carbolic solution, are not excelled by any lotion that I have used when any antiseptic agent is required.

DR. S. W. TORREY, of Beverly:—I am not a bacteriologist, I have made no experiments with chemical vaccines, nor cultivated microbes, intentionally at least; nor have I found time to study carefully *all* the theories and the deductions and the conclusions of the experts who devote their time and intellect to these microscopically momentous questions; questions not yet settled, but the discussion of which has already proved of inestimable value to sanitary surgery. The remarks I make will be on the practical rather than on the scientific side, and a plea on behalf of surgeons who do not practise in hospitals, especially country doctors, for a relaxation of the rigidness of the antiseptic details of an operation laid down by the extremists.

Since the advent of Listerism, what has been regarded as the *sine qua non* of aseptic surgery? Kill the Germs! Germicides first, last, all the time, or septicæmia will be the penalty. The doubter who has dared to speak disrespectfully of microbes has been regarded both in sorrow and in anger for his defection from the cause, and if the name of the repudiator of germicides happen to be that of one who by his surgical triumphs and low mortality rate is world-wide known, our admiration of his results is mingled with regrets for his stubbornness of opposition to accepted theories. But now comes a change of front on the part of the French savants, and we are assured that the microbes, *per se*, are innocuous, that Le Fort denies the pathogenic power of aërial germs, and that he freely exposes open wounds to their action in the Hotel Neckar, and that the microbe is only dangerous by means of the alkaloids it generates, the real virus being chemical and not organic; which gives us hope that the poisonous germicides now in vogue may be pronounced no longer necessary to an aseptic operation, and that some non-homicidal drug may be trusted in as an efficient chemical antidote to the alkaloidal poison that the innocent microbe generates. To what degree the use of carbolic

acid, thymol, corrosive chloride, iodoform and the various other antiseptics in sanitary surgery is necessary, is not for one who considers merely as an out-side observer the widely discrepant opinions of bacteriologists to pronounce; nor do I feel disposed to criticize the religious care given to the subject of chemical antisepsis in large general hospitals; the consensus of opinion is overwhelmingly in favor of the necessity of these safeguards, and the grand results of modern surgery are pointed to as indisputably due to the use of antiseptics.

The question that concerns the surgeon whose operations are done outside of metropolitan hospitals, or in small institutions for gynæcological or other special operations is, how far it is necessary to copy hospital methods to secure as satisfactory results. This question becomes a very practical one if the new theory that the microbes are innocuous is going to render the use of antiseptic drugs as germicides unnecessary, for the elaborate details demanded by the most radical authorities for the preparation, performance and after treatment of an even approximately aseptic operation, are enough to daunt any surgeon who has not at his command the skilled assistants, the paraphernalia and the pecuniary resources of a large hospital. For example: a few months ago I desired to remove the ovaries of a patient in my care, and wishing to learn what a high authority in gynæcology had to advise as necessary antiseptic accompaniments of the operation, I read Hegar's directions, as given in Wood's Cyclopædia of Gynæcology. Fellow-sufferers who have read those directions immediately prior to operating, will appreciate my despondency as page after page proved how reckless I should be to attempt a laparotomy. I found I had chosen the wrong month in the year, I had attended a case of scarlet fever within a week, I had had a case of cancer of the uterus in the hospital, I had no complicated system of ventilation for the room I intended to use, no sterilizing boxes for my instruments. I could not be sure that my buccal cavity and respiratory organs did not harbor bacteria, and I did not feel able to afford the expense of respirators for myself and my assistants. I shuddered at the thought of allowing the presence of germs on the operating table, the pillows, the blankets, the cloth-

ing of all who were in the room, but knew I was helpless, because the text reads, "thorough cleansing with disinfectant fluids and fumigation will not always prove sufficient" to kill the microbes; and I was positive, in face of his disheartening assertions on the subject, that it would be absolutely impossible to make my hands aseptic, or if possible, to keep them so for the time necessary for the operation. Should I abandon the operation? Perhaps I might have done so, but at last comes this consoling paragraph: "Is it possible to make a capital operation, like ovariotomy, positively aseptic? Unfortunately this cannot be done, and probably never will be possible." That was the saving straw, and I grasped it thankfully—and the patient, now without ovaries, having passed through an aseptic convalescence, rejoices in freedom from her old pains, all unaware of the terrible antiseptic incompleteness of the operation.

I have detailed this history in no merely satirical spirit, but to voice, as I think I do, the feelings of many physicians who desire to do every thing that is necessary for the safety of those they operate upon, but who are disheartened by the Chinese wall that towers between them and the domains of aseptic exclusiveness.

The views of the French investigators, before alluded to, constitute one of the surprises; at least to those who, not being in the inner circle of bacterial science, have heard no first whispers of what seems to be an important change in the generally accepted theories upon which antiseptic practice is founded. Such modifications, nay more, such radical changes, as are taking place in bacteriological theories, must necessarily involve changes in the deductions drawn from those theories, and the conclusion the practical physician arrives at is that antisepsis is not one of the exact sciences. The fact that it is the subject chosen for discussion to-day admits this; the abandonment of various details of Listerism that were at first deemed essential, and the modification of others, show it; the differences of opinion as to the germicidal value of the various antiseptics used, the spirited controversies over the estimated values of the materials to be used for ligatures, gauzes and dressings, and the proper ways of preparing them, all prove it. That these are minor

factors in the sum total of sanitary surgery is shown in that they do not impede the steadily improving ratio of successes. There remains one point upon which all are emphatic,—there is unanimity in preaching and in practising the gospel of cleanliness; cleanliness as a fine art, cleanliness as the fundamental condition of success in all operations, whether in hospital or in private practice; a surgical cleanliness, which, to be perfect, implies pure air and personal antisepsis.

In the present day, even under the most rigid antiseptic system, septicæmia cannot be quite banished from the largest hospitals, and this has led to very important changes in hospital building,—the segregation of contagious and infectious diseases in small buildings, the use of fewer beds in wards, the closing of wards periodically, the removal of water closets and drain-pipes as far as possible from the vicinity of the patients, the use of tents or pavilions,—in short, a radical departure from the old style of building large hospitals covering only comparatively limited ground area. But is the same system of antisepsis demanded for isolated surgical cases in healthy localities, either in city or country? It seems to me not to be called for; and my own use of corrosive sublimate, carbolic acid, iodoform and boric acid is founded more I fear upon a blind following of the leaders in antiseptic surgery than upon a profound belief in the necessity of their use outside of the infectious air of the large hospitals. I confess I cannot see why I should invariably use these germicides, with all the minuteness of detail taught by extremists, when I amputate a finger or cut out a wen, more than I should when I nick my cuticle in numerous places during a hurried shaving; or why I should not, to be consistent, boil my hypodermic syringe, put in fresh packing, use none but new needles, and scrub the arm with soap and corrosive, when I inject a drug subcutaneously; for theoretically I am extremely likely to be making a septic inoculation, and systemic disturbance with local manifestations ought to follow.

In my own practice I am inclined to replace corrosive, iodoform and carbolic acid, as disinfectants, by boric acid, particularly since I have learned that powerful germicides are not absolutely required to secure an aseptic operation.

I do this, because, in addition to the published records of serious and sometimes fatal poisoning by these drugs, I have had instances in my own practice that have warned me that idiosyncrasies of patients must not be ignored when we are dealing with poisons. An annoying instance of local irritant action following the use of a 1 to 5000 solution corros. chlor. occurred in one of my obstetrical cases last summer, also bad effects from the use of iodoform suppositories in another. Thus I wish to emphasize the necessity of caution in the use of mercurial and iodoform applications to mucous surfaces. I have seen one case of iodoform poisoning in a mild form in a gynæcological case, where at two separate times the patient was made wildly hysterical by only a moderate application of the drug to the cervix and vagina.

The advantages of boric acid as a germicide perhaps are not as great as those of corrosive chloride, but they certainly are as considerable as of those of iodoform; and if as *germicides* neither of them is demanded to satisfy theory, then in practice outside of hospitals, particularly when large surfaces are to be treated, surely the safer drug should be used. I have dredged the raw surface of extensive burns and scalds with powdered boric acid, to the great comfort of the patient, and with no apparent bad effect. I should not like to use iodoform in such a case so freely. I use it in solution or in powder in uterine cases, with the utmost freedom, with none but good results as far as poisoning is concerned. We all know how much more gratifying our success with otorrhœa is since the dry treatment by boric acid was introduced; cases which have lasted for years have been cured by its persistent application.

In conclusion; I consider the best means of attaining asepticism in private practice to be: First, the dryest, lightest, cleanest room in the house, and the one furthest away from water closets, drains or privies; the preparation of the patient, when there is time (some operations *must* be done upon emergency), by warm bath some hours before the operation; local cleansing of the site of operation with soap and brush and whatever antiseptic is the surgeon's choice, provided the skin is unbroken; with boiled water and possibly the addition of boric acid or chlorinated soda if there is a large absorptive surface; the

disinfection of instruments in boiling water; the use of absorbent cotton or of worsted in various sized balls covered with cheese cloth previously disinfected, to be thrown away after once using, instead of sponges; the use of hot water, or torsion, instead of ligatures, to check bleeding, whenever possible; the sealing of wounds by collodion or adhesive plaster unless sutures are imperatively called for; the personal disinfection of the surgeon's hands before operating and before each dressing of the wound, and the use of boric acid wherever practicable.

Dr. J. C. Warren, of Boston:—I desire to say something about the dangers of antiseptics, as the reader has represented far better than I could the advantages of them. What Dr. Torrey said in relation to boracic acid reminded me of a table prepared by Dr. Weeks, of New York, on the relative value of germicidal agents. If I remember rightly his table is something like this:—Corrosive sublimate standing at the head, 1–20,000 would be equal to permanganate of potash 1–800, which would be equal to carbolic acid 1–100, which would be equal to salicylic acid 1–25; and at the foot of the list he puts boracic acid, which has no germicidal effect whatever. Therefore it seems to me that as we seek after drugs safe to the human system, just so we recede from their germicidal value; and when we get one that is absolutely safe, then we find that that one has no germicidal value whatever, according to the chemist.

We know that boracic acid is used largely in the form of powder, and that it is used internally on the mucous membranes, and with satisfactory results, and certainly I should, for one, be sorry to cast out boracic acid as an agent in modern surgery for washing out the bladder or flushing out cavities, or dressing wounds even, but I would not place much reliance on it as producing anything like the antiseptic action of any of the ordinary solutions.

In regard to carbolic acid:—Lister began with 1–1000, and afterward found it necessary to increase its strength to 1–100; but now 1–50 or 1–40 is the strength ordinarily used; 1–20 much less frequently. This is in the watery solution. In dressings what value has carbolic acid? A

German investigator has made some very interesting experiments concerning dressings containing different kinds of antiseptics, and has found that he has been able to make gelatine cultures from nearly every type of antiseptic dressing which he has obtained from the manufacturer. Amongst these were the dressings made with carbolic acid.

Observations have shown that these dressings lose their strength very considerably after a certain length of time. For instance, Lister carbolized gauze, when fresh, contained 2.6% of carbolic acid. Three months later it contained only 1.4% of carbolic acid, showing that old dressings of carbolized gauze are very liable to be much weaker than we suppose they are, and that it is important to use them in as fresh a state as possible. Carbolized oil makes a very comfortable and pleasant antiseptic dressing, but according to the chemist it has no germicidal value whatever. Germs will grow in a 1–20 mixture of carbolized oil just as well as they will in the plain oil, therefore bone drainage-tubes, put up in this carbolized oil, do not owe their aseptic condition to the agent in which they are immersed. They owe it, probably, to the very clean manner in which they are put up, and the very firm manner in which they have been sealed, which keep out the germs.

I think there are a great many cases of poisoning by germicidal agents which go unrecognized at the present time. The hospital surgeons, as a rule, are beginning to recognize these cases; but it is only recently that they have done so.

A case of carbolic poisoning occurred to me recently. A patient was badly burned about the hands, a little on the face, and in one or two small spots about the chest. No very extensive surface was involved. This was dressed with carbolized vaseline 1–40, not a very strong application apparently. And here I think is usually where the poisoning comes in. The friends were changing the dressing very frequently, so that the patient, instead of getting one dose of the 1–40 really was getting a great deal more. The result was, nervous disturbance, irritability, some fever, discolored urine, and a great deal of suffering and irritation, which was instantly relieved by removing the carbolized dressing and putting on simple vaseline. I think

in a good many patients the urine would be found to be discolored, and it is a good plan to keep watch of that symptom.

In regard to sublimate. We know its powerful germicidal action. It is so powerful, we have such confidence in it, that we are learning to use it in very dilute solutions, going from 1–1000 to 1–50,000 in certain cases, in washing out cavities, douching, giving baths, etc. For instance, we may give an arm or a foot a sublimate bath. 1–1000 would no doubt be too strong. And yet I had just the experience that has been reported in the case of a lady who was under my care. She had a crushed wound of the thigh which I was treating with a bichloride poultice. This dressing can be applied in the moist state, covered with cheese cloth. It is called an antiseptic poultice, and is a very clean application. There is no smell, no staining of the skin; it leaves everything absolutely sweet and clean to look at. That patient was kept under my observation for a certain length of time, and then went to her home in the country. Soon after I found she was having a good deal of digestive disturbance, persistent diarrhœa. She was an old lady, and one day it flashed across me that she was getting rather more sublimate poultice than she ought to have. I stopped that and put on some simple ointment, and all the digestive disturbance ceased immediately.

Where we are using these powerful germicides we must learn to use them with the same precaution that we exercise when we give opium or other powerful drugs. There is one weak point in the sublimate, and that is, the changing into a compound which does not have any antiseptic value. I should not think of going down to any of the instrument makers and buying a box of bichloride gauze and using it with the idea that I was getting an antiseptic dressing. I should be afraid that it was not fresh, and perhaps inert. I should prefer to use it very freshly made, to wring it out freshly, if I were using the sublimate gauze as a dressing, which I do not use, chiefly on that account.

Then there is the other change into the albuminate, which is familiar to you all, no doubt. It has been found that if equal parts of a 1–2000 solution of sublimate and blood are

mixed together, germs will grow there just as well as in the plain blood clot. I don't know but that is a pretty satisfactory kind of culture for them to grow in. The sublimate is changed into the albuminate, which is inert. Perhaps that may be one of the reasons why the internal administration of mercury has not brought better antiseptic results such as we had hoped for. Sternberg reckons the amount of blood of an adult as twenty pounds, and he says that enough sublimate to make that aseptic would be three and a half grains. About a grain is as much as we dare to give in twenty-four hours, but owing to the cumulative effect we might perhaps get enough into the system to produce an antiseptic action. Whether it is that we do not get enough in to produce the action, or whether it undergoes certain changes, I will leave for others to decide.

In regard to iodoform. The chemist and the surgeon seem to be strangely at variance as regards the antiseptic action of iodoform. Very few surgeons who have tried iodoform have not been pleased with its aseptic action. It seems to be a very powerful agent, but the experimentalist will tell you that germs will grow in the powder just as well as they will in putrefying blood. They grow, not just as well, but they grow actively. Dr. Jeffries, of this city, has made some interesting experiments which confirm these views. Both were right, probably. At least, there was something right in the views of each of these observers. How can they be reconciled? It seems to me that they can be harmonized on the ptomaine theory. Iodoform may counteract the ptomaine which is formed by the germs, and consequently the harmful agent is removed.

Iodoform poisoning I think has not been recognized as it should have been. I should not be surprised if some one of us had a case of iodoform poisoning, at this very moment, without knowing it. I have known a number of cases of patients who have been delirious and some who have been insane, which were supposed to be cases of insanity, but which, I think, looking back on them, were cases of iodoform poisoning. I have had one or two cases that were very well recognized by myself and others in the Hospital. One case particularly well marked stamped itself very strongly on my memory, and since that time I have never used the powdered

iodoform, and don't think I shall again. I prefer to use it in the form of gauze. I think that good enough. But I would not have it thought that I look with disfavor upon antiseptics. I do not think that we can get along without them. I do not think we can get along with boiling water or with sterilized dressings alone. I tried it some five years ago, before, perhaps, we had gotten up to the practical point of carrying out the pure aseptic sterilized dressing. I had an oven for baking cotton, used boiling water, etc., but did not get very satisfactory results; and I can see now why I did not get them, because I did not clean my hands and did not scrub the wound enough, and did not clean the instruments enough; these are points which have been hammered into us more thoroughly of late years, since that time. I dare say if I were to go back and get out my tin boxes which I used to bring the cotton down to the operating theatre from the oven, that I should get better results than at that time.

I think we must use antiseptic drugs to supplement our personal equation, if I may put it in that way. We cannot, all of us, live up to that point of perfect cleanliness which the idealist would wish us to. Therefore in order to save time, and to counteract the general tendency to dirt in our operations, we must do a little something more than to strive to keep them clean with water.

Another point in antiseptics, and that is, why not more abscesses from subcutaneous injections, and from numerous operations where antiseptics are not used? The dose of the germ is not large enough! Watson Cheyne wrote in one of the English journals within a year on that subject. There was a series of experiments to show that a great many million of micrococci might be introduced into a wound where the resisting qualities were great without producing suppuration. The germ has to have its requisite strength, just as well as the germicide, to produce its characteristic action.

Dr. A. T. Cabot, of Boston:—The only use that antiseptics have in an ordinary operation, it seems to me, is in the way of preparation—preparing the sponges, etc., and the territory in which the wound is to be made. That being carefully done, we can neglect the condition of the air, and

go ahead, much as the old surgeons used to, with care that our instruments do not come in contact with articles which have not been carefully disinfected. The ordinary method of surrounding the wound with towels wrung out with antiseptics is usually sufficient precaution against such sources of danger.

To begin at the right end of this subject, it seems important that we should consider the necessary conditions of putrefaction.

The first necessary condition is heat. Putrefaction does not take place in low temperatures. And the second is a condition of moisture. Now in the treatment of wounds we cannot get rid of the element of heat. The bodily heat is there, and just about enough for the cultivation of germs which do harm. But we can do a great deal in the way of removing the moisture from the wounds and keeping it from them, and I think that is one of the most important steps, a thing which requires a great deal of attention, and in which great care is well repaid, but which is often neglected.

The first obvious precaution is the careful cleansing, and the removal of blood in the wound before closing it. In doing up a wound after operation, and always after providing drainage tubes, if necessary, for adequate escape of fluids, apply firm pressure. Wring out the wound with dry sponges placed over it, and get the last drop of blood out of the tissues if possible. Then get your outside dressing arranged ready to put on. Take off the last sponges and clap the dressing on, and keep the pressure up until the swathe brings its pressure to bear, so that it cannot have time to fill up with either blood or serum. Of course the tubes will carry away any secretion from the deeper parts of the wound. If possible, close the deeper parts with sutures. This is better than drainage, for the healing is quicker. If we can sew the deeper parts of the wound tightly together, healing taking place by first intention, the fluids cannot accumulate there, and we do not have this source of putrefaction. I think that one great use of the antiseptic powders, such as iodoform powder, and boracic powder, is in their drying influence. In trying to get first intention, powdering the edges of the wound with drying

powder removes all moisture and is an essential, almost, and I believe one great reason why iodoform appeared of such immense advantage, when it was first used as a powder, was that it caused a dry wound which healed by first intention. It took up the fluid, and the wound was aseptic in consequence.

The dressing (with this same object in view of keeping the wound dry) should be itself dry, and should have great absorbent power. Any one who looks over the literature of surgical dressings will find what an immense number of substances have been used for this purpose; and all with excellent results. Beginning with peat dressings of the Germans, the various gauzes, or cotton rendered absorbent by the removal of fat—all these dressings have the one quality in common, that they take up moisture and keep the wound dry. I think if I had to give up either all antiseptic washes, or the dry treatment of wounds, I should willingly give up the former in favor of the dry treatment, and I think the results would bear that position out.

There has lately been a hue and cry raised against antiseptic surgery, because of the success which peritoneal surgery has had without the use of antiseptics. I happened to see Dr. Bancroft, in London, operate on his eightieth case in which he did not use any antiseptic. His instruments were immersed in water drawn from the tap. Having spilled the cyst fluid into the cavity, he irrigated with two or three gallons of water drawn from this same tap, not sterilized in any way whatever. In that case there was a rupture of the intestines. He sutured it, afterwards irrigating the cavity thoroughly in the way I described. The temperature never went above 99.5°, and it made his eightieth case of laparotomy without antiseptics.

Now that would seem to be a blow to any one who believed in the necessity of antiseptics in surgery. But the later researches of Watson Cheyne have shown that the peritoneal cavity, instead of being remarkably susceptible to septic influences, is on the contrary *remarkably tolerant*, and it takes a pretty good dose, as Dr. Warren put it, of septic material in the peritoneal cavity to cause any harm. And that material has got to find blood or other fluids in which it can germinate. A very large dose is tolerated in

a dry cavity. It is this quality of the peritoneum, which has only recently been recognized, which makes it not a proper field for testing the value or uselessness of antiseptics. Trying the same treatment in wounds where there are large cellular spaces, or in a joint, for instance, where the absorptive power is not great, I think that those surgeons who are so enthusiastic over the water from the tap would have results which would open their eyes.

I wish to say a word about antiseptic surgery—about the destruction of germs where they already have a foot-hold. The familiar treatment of such wounds by irrigation, by soaking the part in antiseptic solutions, is well known to all, and every one is interested in the antiseptic solutions which are safe for this purpose. I have seen cases of carbolic poisoning from the use of solutions in this way, and here I would stop for a moment to say that I think many cases go unrecognized from the fact that the urine is often not dark when passed, but if kept for two or three hours becomes dark.

The danger recognized from corrosive sublimate, though less than one would at first suppose, is still great. I think we have two antiseptics which have not been mentioned, one of which I have spoken of in other places often, and I mention it again because I still firmly believe in its great efficiency. About ten years ago, I published a paper in the Medical Journal of this city on the relative strength of antiseptics. At that time corrosive sublimate had not appeared as an antiseptic. I tested carbolic acid, chlorinated soda, permanganate of potash, chloride of zinc, thymol and salicylic acid. I think there were others, but these I remember. Carbolic acid, in a strength of 1–20, easily led the list. The tests were made by adding the acid to putrid solutions, mixing them thoroughly, and then transplanting a drop of that solution into another, aseptic, solution, and that was covered and watched to see if germs developed in it. I found that 1–20 carbolic acid would kill germs in a putrid solution inside of ten seconds. Then taking a drop and putting it into the aseptic solution, that would remain perfectly clear for an indefinite time.

I found that chlorinated soda, one part of the liquor sodæ chlorinatæ freshly prepared to ten parts of water,

was almost equally efficient in destroying the germs, and since that time I have frequently used this chlorinated soda solution in the place of carbolic, in order to avoid the poisoning effect of the latter. I have constantly seen the condition of the wound clean up under its use, all fetor disappear very quickly, and in the gynæcological operations especially, where large douches are called for, I think there is nothing which I have tried that comes up to chlorinated soda in efficiency and safety.

Many efforts have been made, by antiseptic injections, to destroy septic processes already started. When I was in Vienna they were trying the injections of carbolic acid all around erysipelas, but the results were not very satisfactory.

Dr. Jewett, of Fitchburg:—I will speak of results only. I have noticed that in the last four or five cases of herniotomy in which I have paid special attention to cleanliness of the external parts, recovery has taken place without a sign of pus. The last six or eight compound fractures of the skull which I have attended, have had very little or no purulent secretion. This never did happen, so far as I know, in the history of my practice in the army, and I believe that the personal cleanliness of the hands and body previous to the operation have made the difference in the results.

Dr. O. H. Everett, of Worcester:—I propose to describe the methods in use at the Worcester City Hospital, where we have a daily average of nearly thirty cases. Of patients in the hospital last year, 228 were classified as "Surgical Diseases," and 259 as "Injuries." Of these, a large number are wounds which have had a good opportunity to become contaminated before we get them. We think we get very good results, however. The last report gives average stay in hospital 19 days. Ten years ago, before thorough antisepsis was practised, the average stay was 23 and 24 days.

Cases of accident, wounds, crushed hands, etc., are thoroughly cleansed with soap and water, under ether, if necessary, and made as thoroughly aseptic as possible, by bichloride solution, 1 to 2000, used in the irrigator, paying particular attention to all the corners and recesses.

Compound fractures are cleansed in the same way, enlarging the opening if necessary, and draining, unless the opening is small, without comminution of fragments, when I try to seal the opening with compound tincture of benzoin. Abscesses are opened freely and washed out. Cellulitis with suppuration is opened, washed out, and drained with tubes in all directions. A few cases of suppurating glands I have incised, curetted, disinfected and sewed up, with good results. Before any operation, the region of the disease or injury is thoroughly washed with soap and water, with one of the large sized rubber brushes, then scrubbed with bichloride solution, 1 to 1000 or 1 to 2000, according to circumstances. Surrounding parts are covered with towels wrung out of hot bichloride solution. Hands and forearms of operator and assistants scrubbed with soap and bichloride solution, each surgeon having his own nail brush, and also his own nail cleaner which is kept near the sink and saves putting one's hand in the pocket for a knife and thus washing hands again.

We have never used the spray. For sponging we use sometimes absorbent cotton, but usually pieces of bichloride gauze. In the Memorial Hospital, a much smaller institution, with a mixed medical and surgical service, artificial sponges made of Germantown wool enclosed in gauze and sterilized by boiling, are used, but I like them no better than gauze for ordinary use.

All the gauze used is prepared in the hospital, first being put through a process to remove the dressing and make it readily absorbent, then soaked in a 1 to 1000 bichloride solution, after which it is dried and put away in tin boxes with closely-fitting hinged covers. We also use a hydronaphthol gauze, prepared in the same way with a solution of hydronaphthol about 1 to 1100. Iodoform gauze is not much used by either of the surgeons, being prepared extemporaneously when it is wanted. During an operation the wound is frequently cleansed by a stream of warm bichloride from an ordinary fountain syringe held above the table by a support arranged for the purpose. At the conclusion, before putting in stitches, the wound is thoroughly irrigated with hot bichloride solution (112°–115°), either from the irrigator or from a pitcher. Our table has a sliding shelf,

which is under the table when not in use, but which can be drawn out to form a rest for the hand and forearm for operations on that member, making it very easy to keep any water from running under the patient, and at other times forming a very convenient resting-place for basin or instruments.

For ligatures cat-gut is employed. It is prepared by soaking in bichloride, 1 to 500, put through turpentine, and then kept in absolute alcohol till wanted. It is drawn out and cut off at the time of use. I never had any trouble from it but once. That was in using the larger sized in a case of herniotomy. Then I got a slight rise in temperature, local swelling, etc., and finally an abscess. This I ascribed to the large cat-gut not being thoroughly aseptic. One of my colleagues has had a similar experience. I have had no trouble with fine or medium sized cat-gut. A few years ago I used for ligatures silk which was supposed to have been made aseptic, cutting the ends short. Usually this made no trouble. Occasionally a sinus would remain till a ligature was discharged. Therefore I have used cat-gut entirely for ligatures with great satisfaction.

For drainage, rubber tubing is used, which is kept prepared and cut into convenient lengths in a solution of hydronaphthol. In small wounds, and when the entire raw surfaces can be closely approximated, no drainage seems necessary, or at most only a few strands of cat-gut.

For sutures I use the black iron-dyed silk almost always, occasionally using cat-gut. I have never had any trouble with the silk causing suppuration in the wound. Occasionally there will be a few drops of pus in the course of the suture. The stitches are very easily seen when it is time to take them out, and usually entirely unirritating. The silk is not treated antiseptically till the time of the operation, when the necessary number of needles are threaded and put to soak in hydronaphthol solution.

Instruments are treated in the same way, after being first soaked for a few minutes in water as hot as can be drawn from the pipes which come from the boiler. Then a hydronaphthol solution is made by first preparing a 20% solution in alcohol. Of this three drachms are added to a five pint bottle of hot water. This does not affect instruments or the

hands, and with us it has entirely superseded carbolic acid for use in the instrument trays. Drainage tubes are kept in it and needles and silk are soaked in it before being used. It costs about two cents per gallon. After operation I apply iodoform from a powder blown over the line of sutures. It seems to keep the edges dry. Sometimes, but not always, some more is put over the inner layers of gauze. The usual antiseptic gauze dressing is then applied. Outside of the gauze a good layer of dry absorbent cotton, retained by an ordinary roller bandage, snugly applied. This gives a soft, elastic compression to hold the parts together. When for any reason a wound is to be packed, iodoform gauze is used for that purpose.

There is other antiseptic solution which we use to some extent and have some faith in, though it stands low in the list of recognized antiseptics, viz., chloral hydrate. We use it in the strength of one drachm to the pint of water. For cellulitis, for instance, cold wet chloral compresses act very well. It has a decided sedative action, relieving pain, and being very comfortable to the patient. I have seen wounds do very well with it, but do not use it now for that purpose. The rough and uncomfortable hands, often resulting from constant wetting in the bichloride, if washed in the chloral solution, will feel soft and comfortable. For this purpose the chloral solution is kept in our operating room, and by the surgeon's hand-basin in each ward, ready for a final rinsing of the hands.

Dr. G. DeN. Hough, of New Bedford:—Wounds may be infected in two ways: 1st, by air infection; 2d, by contact infection.

The prevention of air infection requires that the air admitted to our operating room be freed from germs. In private practice this is impossible, and even in hospitals with the most elaborate precautions very doubtful. The most careful disinfection of an operating room and its contents diminishes, indeed, the risk of contact infection, and is therefore of value, but leaves the way open for air infection. Practically, we must rely on irrigation for the destruction or removal of any organisms which may chance to fall upon the wound from the air.

Prevention of contact infection is the most difficult antiseptic problem, and for its solution an immense amount of detail is required.

I. Preparation of the Patient.—This will differ a little according to circumstances, and we may distinguish two classes of cases. 1. Where an operation must be done at once. 2. Where we may select our own time for operating.

(*a*) *Emergency Cases.*—1. If permissible the patient receives a soap and water bath, followed by a sponge bath with sublimate solution 1–2000. 2. Then, before etherization, if possible, scrub the part to be operated upon and the neighboring parts to a distance of several inches beyond the probable limits of the final dressing with (a) nail brush, soap and hot water; (b) turpentine, if the part is soiled with machine grease or any dirt that resists the soap; and (c) with alcohol to remove the turpentine and any inorganic matter left by the first two scrubbings. 3. During the soap and water process the parts are cleanly shaved. 4. Finally, thoroughly wash the field of operation with sublimate 1–1000 to 1–5000 and isolate it by towels wet in sublimate 1–1000 or hydronaphthol 1–1200. The latter is to be preferred, since it has no effect upon instruments.

(*b*) *Cases wherein one may select his own time for operating.*—I prefer to operate in the morning and prepare the patient the night before, as follows:—1. A soap and water bath and sublimate sponging. 2. Part to be operated on and parts around scrubbed and shaved as above described, but 3, immediately covered with a wet dressing of carbolic 1–30 or sublimate 1–2000. The former seems to penetrate the hair follicles, sebaceous and sweat glands much better than the latter. This dressing is not removed till the patient is on the operating table, and then the parts are at once isolated by hydronaphthol towels.

II. The Operator.—If he has recently attended erysipelas or other septic diseases, an autopsy or the like, a bath, sublimate sponging 1–2000, and entire change of clothing, will render him perfectly innocuous.

Scrub hands and fore-arms with nail brush, soap and hot water for five minutes; clean the nails and scrub again.

Then scrub for three minutes with sublimate 1–1000. Before the hands are purified wet the beard with sublimate and put on a rubber apron. After the hands are cleaned, they must touch nothing that is not unquestionably aseptic, and are rinsed in sublimate solution once in a while during the operation, and always before thoroughly examining the wound.

III. Operating Room and its Contents.—(*a*) *In Private Practice.*—I take any room I can get and try to have it ordinarily clean and well ventilated, and use for an operating table anything from an antique oak dining-table to a pine board across a couple of barrels. On the table I put a quilt with edges rolled up so as to make a trough running lengthwise the table, over that a rubber cloth, and elevate one end of the table so that irrigation fluids, etc., may run off into a bucket or small tub.

(*b*) *At the Hospital.*—Whenever a septic case has been operated upon, or whenever any important operation is to be performed, the operating room is washed and then disinfected by burning sulphur, the windows are sealed and wet blankets hung over the doors. The room is left closed twenty-four hours, then aired, and three or four hours later the entire room (and everything in it, operating table, instrument stands, dressing jars, etc. etc.) is washed with cloths wet in sublimate 1–500, except the metallic articles, for which carbolic 1–20 is used.

IV. Instruments.—All instruments are as simple as possible. Many are made of one solid piece of steel, and those which are of more than one piece so come apart as to render perfect cleansing easy. Immediately before an operation all instruments to be used are baked for a half hour, or boiled in carbolic 1–20 for fifteen minutes, or both, and then immersed in saturated hydronaphthol solution. Once sterilized, instruments are carefully guarded from air and contact infection until the operation is completed.

V. Sponges.—(*a*) *In private practice*, new sponges are bought for every operation. They are washed and kept for at least twenty-four hours in sublimate 1–500, containing 10 per cent. glycerine. (*b*) *At the Hospital*, new sponges are washed, and then kept in carbolic 1–20 for at

least two weeks before using. Sponges that have been used are washed, bleached, rinsed, and then kept in carbolic 1–20 for at least two weeks.

VI. SUTURES AND LIGATURES.—(*a*) *Wire.*—Sterilized by boiling in carbolic 1–20.

(*b*) *Silk.*—Sterilized by boiling in sublimate 1–500 and kept in the same solution until used.

(*c*) *Cat-Gut.*—The best gut that can be bought is wound on test-tubes, scrubbed with nail brush, soap and water, rinsed, immersed for twenty-fours in 1 per cent. sublimate solution, and then for twenty-four hours in strong alcohol. It is preserved in alcohol, or alcohol containing 1 per cent. of sublimate and 10 per cent. of glycerine. Even prepared in this way gut is not completely sterilized, and stitch hole abscesses occur in about one case in ten. This, however, rarely interferes with primary union. As soon as I discover them I remove the stitches and wash out the holes with 1–2000 sublimate by means of a medicine dropper on the end of a fountain syringe. Almost without exception this procedure stops the suppuration at once.

VII. DRESSINGS.—Sublimated gauze and sublimated paper wool are used mostly, sometimes acetate of alumina gauze or iodoform gauze.

(*a*) *Gauze.*—1. Sublimated gauze is prepared by soaking absorbent gauze for at least twenty-four hours in sublimate 1–500 containing 10 per cent. glycerine, and is not taken out of the solution till needed for use. Rarely a patient is found in whom this gauze causes acute eczema. In such cases I use absorbent gauze soaked in a solution of 2. Acetate of alumina, 3 per cent. This gauze is also used when a large cavity or wound has to be packed, and I fear toxic effects from sublimate or iodoform. 3. Iodoform gauze is prepared by the New York Hospital formula. It is used about the muco-cutaneous openings, and to pack small cavities.

(*b*) *Sublimated Paper Wool.*—This is manilla paper cut into shavings and sublimated. It is made by Ann Ende, in Hoboken. I use it instead of cotton to make up the bulk of a dressing because, being more porous, it dries up the serous discharge more quickly. Bags of absorbent

gauze of various shapes and sizes are kept in a jar of sublimate solution. Immediately before an operation as many bags as will be needed are filled with the paper wool and kept wrapped in aseptic towels till called for.

VIII. Assistants.—There are very few men who do not require careful watching during an operation to avoid their infecting the wound. I find that one of the greatest obstacles to the attainment of perfectly aseptic results is lack of knowledge or care, or both, on the part of assistants. Many a time have I seen a man thrust into a wound fingers which I knew from their ebonized tips were at least a possible source of infection.

IX. Irrigation.—From time to time, during an operation, the field is irrigated with sublimate 1–5000 to 1–10,000. When the operation is finished the whole wound and its surroundings are thoroughly cleansed and very freely irrigated with the same or a stronger solution. In this way we probably kill or wash away any organisms that have reached the wound from the surrounding air or by contact.

X. Obliteration of Cavities.—If in spite of our precautions a few microbes are left in the wound, they may still be destroyed by the vital power of the tissues, and one of the greatest helps we can afford in this struggle is the careful obliteration of all cavities, and accurate coaptation of wound surfaces, for any cavity will act like an incubating flask, furnishing the best possible conditions for germ growth. Moreover, since primary union is our object we have another reason for obliterating cavities. This is of special importance in the treatment of abscesses.

XI. Application of Dressings.—Another important matter is that dressings be applied in such a way that no movement of the patient can so separate the dressing from his body that air can get to the wound. A light rubber bandage is often of great assistance here. Wounds about the neck, axilla and groin, give most difficulty in this particular.

XII. Other things being equal, the danger of contact infection is reduced to a minimum when but one pair of hands touches the wound. Let, therefore, as few hands

as possible touch the wound or any object which is to be used about the wound. Let the operator himself take the instruments from their pans, the ligatures from their jars. Let only the one who is to use the sponges remove them from their jars or cleanse them during the operation.

The method of procedure above detailed I have tested during four years in a goodly number of accidental wounds and 304 operations,—145 in hospital, 159 in private practice. Not a single patient has developed erysipelas or any other form of wound infection. On the contrary, I have frequently been able by eradicating its cause to cure septic disease with great rapidity. On the one hand suppuration, except stitch-hole abscesses, has developed but twice, and in each case from a recognizable and avoidable cause; while on the other hand primary union is the rule even in the treatment of abscesses.

Massachusetts Medical Society.

PROCEEDINGS.

CONTENTS OF APPENDIX.

	PAGE.
Proceedings of the Councillors, 1886–87	5
Proceedings of the Society, Annual Meeting, June, 1887 .	13
Treasurer's Annual Report	18
Officers of the Society	22
Officers of the District Societies	27
Proceedings of the Councillors, 1887–88	31
Proceedings of the Society, Annual Meeting, June, 1888 .	41
Treasurer's Annual Report	46
Officers of the Society	50
Officers of the District Societies	55
Proceedings of the Councillors, 1888–89	59
Proceedings of the Society, Annual Meeting, June, 1889 .	68
Treasurer's Annual Report	73
Officers of the Society	76
Officers of the District Societies	81

Massachusetts Medical Society.

PROCEEDINGS OF THE COUNCILLORS.

October 6, 1886.

A Stated Meeting of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Wednesday, October 6, 1886, at 11 o'clock, A.M.

The President, Dr. Thomas H. Gage, in the chair.

The following Councillors were present:

Barnstable.
P. Pineo.

Bristol North.
G. Mackie,
J. E. Totten.

Bristol South.
J. Dwelly,
S. W. Hayes,
J. H. Mackie,
J. J. B. Vermyne.

Essex North.
G. Montgomery,
L. A. Woodbury.

Essex South.
H. Colman,
A. H. Johnson,
T. Kittredge,
T. L. Perkins,
S. W. Torrey.

Middlesex East.
F. F. Brown,
J. M. Harlow.

Middlesex North.
W. Bass,
W. H. Lathrop,
A. W. Lavigne,
F. Nickerson,
M. G. Parker.

Middlesex South.
Z. B. Adams,
E. R. Cutler,
C. K. Cutter,
W. W. Dow,
R. L. Hodgdon,
E. G. Hoitt,
H. Holmes,
A. Hosmer,
O. E. Hunt,
G. C. Pierce,
J. B. Taylor,
G. J. Townsend,
A. C. Webber,
H. C. White.

Norfolk.
G. O. Allen,
C. A. Bemis,
G. W. Clement,
I. H. Hazelton,
J. G. S. Hitchcock,
G. E. Mecuen,
G. K. Sabine.

Norfolk South.
G. W. Fay,
C. C. Tower.

Plymouth.
H. W. Dudley,
J. C. Gleason.

Suffolk.
S. L. Abbot,
C. J. Blake,
H. I. Bowditch,

E. H. Bradford,
A. T. Cabot,
D. W. Cheever,
F. W. Draper,
T. Dwight,
R. H. Fitz,
M. F. Gavin,
G. W. Gay,
W. H. H. Hastings,
W. Ingalls,
B. J. Jeffries,
S. W. Langmaid,
M. B. Leonard,
F. Minot,
C. B. Porter,
J. P. Reynolds,
W. L. Richardson,
B. S. Shaw,
A. D. Sinclair,
A. M. Sumner,
C. W. Swan,
G. G. Tarbell,
O. F. Wadsworth,
W. G. Wheeler,
E. N. Whittier,
H. W. Williams.

Worcester.

A. G. Blodgett,
W. Davis,
T. H. Gage,
E. B. Harvey,
G. M. Morse,
G. C. Webber.

Worcester North.

B. H. Hartwell.

Total, 82.

The record of the previous meeting was read and accepted.

On nomination by the President the following were appointed Delegates to other State Medical Societies :

Vermont.—Drs. C. M. Hulbert, of South Dennis; B. D. Gifford, of Chatham.

New York.—Drs. A. M. Smith, of Pittsfield; H. M. Quinby, of Worcester.

New York State Medical Association.—Drs. C. L. Hubbell, of Williamstown; S. W. Bowles, of Springfield.

The Committee on Membership and Finances reported through Dr. Minot. In accordance with their recommendation the following were allowed to resign :

William A. Tremain, of Providence, R. I.
Charles H. Yale, of Tiverton, R. I.

Also the following were allowed to retire :

Joseph B. Fobes, of Bridgewater.
James F. Harlow, of Quincy Point.
Samuel Kneeland, of Boston.

Also the following were dropped from the roll on account of removal from the State and non-payment of dues :

Eben T. Aldrich, of Danville, Pa.
Eugene Fuller, of New York, N. Y.
Charles E. Severance, of Newark, N. J.

The following were restored to Fellowship in the Society:

Charles Henry Call, of South Yarmouth.
James Perrot Prince, of Durban, South Africa.

Adjourned at 12.05, P.M.

FRANCIS W. GOSS,
Recording Secretary.

FEBRUARY 2, 1887.

A STATED MEETING of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Wednesday, February 2, 1887, at 11 o'clock, A.M.

The President, Dr. THOMAS H. GAGE, in the chair.

The following Councillors were present:

Bristol South.
J. H. Mackie,
J. J. B. Vermyne.

Essex North.
L. A. Woodbury.

Essex South.
H. Colman,
J. Garland,
W. A. Gorton,
A. H. Johnson.

Middlesex East.
J. S. Clark.

Middlesex North.
F. Nickerson,
M. G. Parker.

Middlesex South.
T. Crozier,
R. L. Hodgdon,
E. G. Hoitt,
H. Holmes,
A. Hosmer,
G. J. Townsend.

Norfolk.
G. O. Allen,
G. W. Clement,
J. G. S. Hitchcock,
H. T. Mansfield,
G. E. Mecuen,
J. H. Richardson.

Norfolk South.
G. W. Fay,
J. A. Gordon.

Plymouth.
H. W. Dudley,
A. E. Paine.

Suffolk.
S. L. Abbot,
C. J. Blake,
H. I. Bowditch,
A. T. Cabot,
D. W. Cheever,
H. Curtis,
O. W. Doe,
F. W. Draper,
R. H. Fitz,
C. F. Folsom,
W. H. H. Hastings,
J. Homans,
W. Ingalls,
B. J. Jeffries,
F. I. Knight,
S. W. Langmaid,
G. H. Lyman,
A. E. McDonald,
F. Minot,
C. B. Porter,
J. P. Reynolds,
W. L. Richardson,
G. C. Shattuck,
B. S. Shaw,

A. M. Sumner,	*Worcester.*	*Worcester North.*
C. W. Swan,	G. Brown,	B. H. Hartwell.
G. G. Tarbell,	G. E. Francis,	
E. N. Whittier,	T. H. Gage,	Total, 60.
H. W. Williams.	E. B. Harvey.	

The record of the last meeting was read and accepted.

On nomination by the President the following were appointed Delegates of other State Medical Societies:

Maine.—Drs. R. T. Davis, of Fall River; J. A. Douglass, of Amesbury.

New Hampshire.—Drs. J. M. Harlow, of Woburn; E. B. Harvey, of Westboro'.

Rhode Island.—Drs. J. H. Mackie, of New Bedford; Z. B. Adams, of Framingham.

Connecticut.—Drs. J. P. Reynolds, of Boston; F. K. Paddock, of Pittsfield.

New Jersey.—Drs. J. G. Park, of Worcester; J. Seaverns, of Roxbury.

On nomination by the President the following Committees were appointed:

To Audit the Treasurer's Accounts.—Drs. A. L. Mason, A. Wood.

To Examine the By-Laws of District Societies.—Drs. S. D. Presbrey, J. C. White, F. W. Chapin.

The Committee on Membership and Finances reported through Dr. Minot. In accordance with their recommendation the following were allowed to resign:

Charles B. Graves.
James W. Heustis, of Pittsburg, Pa.
William E. Vermilye, of Flushing, N. Y.

Also the following was allowed to retire:

George F. Bigelow, of Boston.

Also the following were dropped from the roll for five years' delinquency in assessments:

Henry O. Dunbar, of Athol.
William P. Jones, of Boston.
Henry H. Smith, of Hudson, N. Y.
Thomas Willmot, of Northbridge Centre.

Also the following, having forfeited their membership by removal from the State and non-payment of dues, were dropped from the roll:

Guy H. Gardner, of Travares, Fla.
Ralph M. Canfield, of Providence, R. I.
George S. Knickerbocker, of New York, N. Y.
Enoch Q. Marston, of Centre Sandwich, N. H.
William H. Page, of Las Vegas, New Mexico.
Henry A. P. Rundlett, of Cleveland, O.
Frederick Scott, of Kimball, Dakota.
Thomas D. Smith, of Broadalbin, N. Y.

The following was restored to Fellowship in the Society:

Norman Perkins Quint, of Leverett.

Adjourned at 11.45, A.M.

FRANCIS W. GOSS,
Recording Secretary.

ANNUAL MEETING.

THE ANNUAL MEETING of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Tuesday, June 7, 1887, at 7 o'clock, P.M.

The President, Dr. THOMAS H. GAGE, in the chair.

The following Councillors were present:

Barnstable.
G. W. Doane,
G. N. Munsell.

Berkshire.
H. J. Millard,
J. L. Miller,
A. M. Smith.

Bristol North.
A. S. Deane,
F. A. Hubbard,
G. Mackie,
J. Murphy.

Bristol South.
E. P. Abbé,
S. W. Bowen,
J. H. Jackson,
C. D. Prescott.

Essex North.
C. N. Chamberlain,
G. Montgomery.

Essex South.
C. Burnham,
D. Coggin,
H. Colman,
T. Kittredge,
C. A. Lovejoy,
T. L. Perkins,
C. C. Pike.

Franklin.
E. A. Deane.

Hampden.
G. E. Fuller,
W. Holbrook,
A. R. Rice.

Hampshire.
O. F. Bigelow,
J. M. Fay,
B. D. Sheedy,
J. Yale.

Middlesex East.
F. F. Brown,
A. H. Cowdrey,
W. F. Stevens.

Middlesex North.
W. Bass,
J. H. Gilman,
W. F. Heald,
J. C. Irish,
W. H. Lathrop,
F. Nickerson.

Middlesex South.
Z. B. Adams,
C. H. Cook,
T. Crozier,
W. W. Dow,
H. M. Field,
E. J. Forster,
R. L. Hogdon,
H. Holmes,
A. Hosmer,
J. B. Taylor,
G. J. Townsend,
H. P. Walcott,
A. C. Webber,
W. W. Wellington.

Norfolk.
G. O. Allen,
J. W. Chase,
G. W. Clement,
W. C. B. Fifield,
E. P. Gerry,
A. D. Kingsbury,
G. E. Mecuen,
G. F. Rogers,
G. K. Sabine,
H. R. Stedman,
G. D. Townshend,
C. F. Withington.

Norfolk South.
J. A. Gordon,
F. C. Granger,
J. W. Spooner.

Plymouth.
H. W. Dudley.

Suffolk.
S. L. Abbot,
J. Ayer,
H. J. Barnes,
H. I. Bowditch,
E. H. Bradford,
F. E. Bundy,
J. F. S. Bush,
A. T. Cabot,
J. R. Chadwick,
J. W. Cushing,
F. W. Draper,
T. W. Fisher,
F. B. Greenough,
W. H. H. Hastings,
W. C. Holyoke,
J. Homans,
W. Ingalls,
G. H. Lyman,
F. Minot,
A. Post,
W. L. Richardson,
G. C. Shattuck,
A. D. Sinclair,
C. W. Swan,
G. G. Tarbell,
O. F. Wadsworth,
J. C. Warren,
A. P. Weeks,
J. C. White,
E. N. Whittier,
E. Wigglesworth,
H. W. Williams.

Worcester.
A. G. Blodgett,
G. Brown,
W. Davis,
G. E. Francis,
T. H. Gage,
E. B. Harvey,
J. O. Marble,
J. M. Rice,
W. E. Rice,
L. Wheeler,
A. Wood.

Worcester North.
B. H. Hartwell,
F. H. Thompson.

Total, 113.

The record of the previous meeting was read and accepted.

The Secretary read the names of new and of deceased Fellows.

The Treasurer, Dr. Draper, read his annual report.

The Auditing Committee reported that they found the

accounts properly vouched and correctly cast, and that the Society's invested funds corresponded with the schedule exhibited.

The Treasurer's report was then accepted.

The Committee on Membership and Finances reported through Dr. Minot and recommended that $1000.00 from the surplus income be distributed among the District Societies.

The recommendation of the Committee was adopted.

In accordance with the recommendation of the same Committee, it was voted that the following, having forfeited their membership by removal from the State and non-payment of dues, be dropped from the roll:

Edward E. Gaylord, of East Woodstock, Conn.
Joseph P. Geoffrion, Varennes, Can.
Herbert D. Hicks, of Amherst, N. H.
Edward Hyde, of Lakeville, Fla.
George L. Perry, of Providence, R. I.
Samuel L. Reynolds, of New York, N. Y.
Henry P. Perkins, of Victor, N. Y.
Frederic J. Sanborn, of Norfolk, Conn.
Charles A. Holt.
Joseph C. Yale.
George T. Moffatt, of Denver, Col.

Also that the following be allowed to resign:

Ellen M. Patton, of Quincy, Ill.
Herbert J. Pomroy, of Brooklyn, N. Y.
James A. Robinson, of Rehoboth.
David B. Van Slyck, of Marietta, Ga.

Also that the following be allowed to retire:

James Dunlap, of Northampton.
Joshua B. Gould, of Somerville.
William Lester, of South Hadley.
William Read, of Boston.

The Committees on Publications, and on the By-Laws of the District Societies, presented reports, which were accepted.

The Librarian, Dr. Brigham, presented his annual report, which was accepted.

Voted,—That William Droien Collins, of Haverhill, be restored to Fellowship.

The Committee on Nominations reported a list of candidates for the offices of the Society for the ensuing year, and the same were elected by ballot:

President . .	Dr. THOMAS H. GAGE, of Worcester.
Vice President . .	Dr. WILLIAM G. BRECK, of Springfield.
Treasurer . .	Dr. FRANK W. DRAPER, of Boston.
Corresponding Secretary	Dr. CHARLES W. SWAN, of Boston.
Recording Secretary .	Dr. FRANCIS W. GOSS, of Roxbury.
Librarian . .	Dr. EDWIN H. BRIGHAM, of Boston.

Dr. B. JOY JEFFRIES, of Boston, was chosen Orator, and

Dr. CHARLES B. PORTER, of Boston, Anniversary Chairman, for the Annual Meeting of the Society in 1888.

Voted,—That the next Annual Meeting of the Society be held in Boston, on the second Wednesday in June, 1888.

On nomination by the President, the following Standing Committees were appointed:

Of Arrangements.

J. B. Swift, W. W. Gannett, V. Y. Bowditch, H. C. Ernst, O. K. Newell, F. B. Harrington.

On Publications.

G. C. Shattuck, R. M. Hodges, B. E Cotting.

On Membership and Finances.

F. Minot, B. S. Shaw, D. W. Cheever, J. Stedman, E. G. Cutler.

To Procure Scientific Papers.

C. W. Swan, G. S. Stebbins, J. R. Chadwick, R. H. Fitz, H. P. Walcott.

On Ethics and Discipline.

G. J. Townsend, G. E. Francis, A. H. Johnson, C. Howe, F. C. Shattuck.

On Medical Diplomas.

W. L. Richardson, A. H. Cowdrey, E. J. Forster.

Adjourned at 8.15, P.M.

FRANCIS W. GOSS,
Recording Secretary.

Massachusetts Medical Society.

PROCEEDINGS OF THE SOCIETY.

ANNUAL MEETING.

First Day.

The Society met in Huntington Hall, Institute of Technology, Boston, on Tuesday, June 7, 1887, at 2 o'clock, P.M.

The President, Dr. Thomas H. Gage, in the chair.

The following papers were read:

1. Tumors of the Bladder.—By George W. Davis, M.D., of Holyoke. Drs. C. B. Porter, F. S. Watson and J. Homans discussed this paper.

2. Cases of Burns, with special reference to Complications, Sequelæ and Treatment.—By James E. Cleaves, M.D., of Medford. Dr. G. E. Francis made remarks on this paper.

3. Laparotomy for Pus in the Abdominal Cavity and for Peritonitis.—By John C. Irish, M.D., of Lowell. Drs. J. Homans and H. I. Bowditch remarked upon this paper.

4. Fracture of the Spine: Its Immediate Treatment by Rectification of the Deformity and Fixation by Plaster of Paris Jacket.—By Herbert L. Burrell, M.D., of Boston. Drs. A. N. Blodgett and A. P. Clarke spoke upon this paper.

5. Observations on the Puerperal Pelvic Ligaments.—By Stephen W. Driver, M.D., of Cambridge.

6. The Relation of Tea Drinking to Disorders of the Nervous System.—By William N. Bullard, M.D., of Boston. Dr. J. J. Putnam made remarks upon this paper.

7. Pulmonary Tuberculosis as a Sequel to Ordinary Pleurisy with Effusion.—By Herman F. Vickery, M.D., of Boston. Dr. H. I. Bowditch spoke upon this paper.

8. The Surgical Treatment of Chronic Empyemas.—By Maurice H. Richardson, M.D., of Boston. (Read by title.)

Adjourned at 6, P.M.

FRANCIS W. GOSS,
Recording Secretary.

Second Day.

The Society met in Huntington Hall, Boston, on Wednesday, June 8, 1887, at 9 o'clock, A.M., for the exercises of the one hundred and sixth Anniversary.

The President, Dr. Thomas H. Gage, in the chair.

The record of the last annual meeting was read and accepted.

The Secretary read the names of Fellows admitted since the last annual meeting, and of Fellows whose deaths had been reported.

Fellows Admitted since June 8, 1886.

1887	Adams, Edwin Boardman	Springfield.
1886	Andrews, William Henry	Springfield.
1886	Bancroft, Edward Erastus	Waltham.
1886	Barnes, William	Boston.
1887	Bell, George P	Holyoke.
1886	Bullock, Edwin Warren	Haverhill.
1887	Burque, Joseph Georges	Haverhill.
1886	Burrage, Walter Lincoln	Boston.
1886	Cahill, Charles Sumner	Cambridgeport.
1887	Callanan, Sampson Aloysius	Roxbury.
1886	Carter, Cyrus Faulkner	Boston.
1886	Charles, Orlando Warrington	Bryantville.
1886	Cheney, Frederick Edward	Boston.
1887	Cordeiro, Frederick Joaquin Barbosa	U. S. Navy.
1886	Cowles, Frank Augustus	Wenham.
1887	Crocker, Susan Elizabeth	Lawrence.
1887	Culbertson, Emma Bicknell	Boston.
1887	Cushman, Andrew Bernard	New Bedford.
1886	Danforth, William Henry	Worcester.
1887	Davenport, James Henry	Boston.
1887	Deane, Wallace Harlow	Blandford.
1886	Dewey, Charles Gipson	Northampton.
1887	Dexter, Ella Louisa	New Bedford.
1887	Dexter, Franklin	Boston.
1886	Dodge, William Wooldredge	Roxbury.
1886	Donovan, Michael Ricard	Lynn.
1887	Downing, Clarence Ware	Fitchburg.
1887	Draper, Frank Eugene	Boston.
1887	Elliot, Edward Pearson	Danvers.

1886	Fiske, Eustace Lincoln - -	Jamaica Plain.
1886	Fiske, William Boyd - - -	Boston.
1886	Flagg, Payson Jonathan - -	Florence.
1887	Flint, Omar Alpha - - -	Dracut.
1886	Foley, James Leslie - - -	Boston.
1886	Foote, Charles Jenkins - -	Boston.
1887	French, Charles Lindol, - -	Clinton.
1887	Frye, Edmund Bailey - - -	Roxbury.
1886	Gage, Homer - - - -	Boston.
1886	Gifford, John Henry - - -	Fall River.
1887	Gilbert, John - - - -	Fall River.
1887	Gleeson, William Joseph - -	South Boston.
1887	Guild, Edgar Hunt - - -	Ware.
1886	Hall, Mary Ann - - - -	Lowell.
1886	Hatch, George Stephen - -	Cheshire.
1887	Hatchett, William Joseph - -	Melrose Highl'ds.
1887	Hawes, Edward Everett - -	Harwich.
1886	Hayes, Justin Gideon - - -	Ipswich.
1887	Hooker, Edward Dwight - -	No. Cambridge.
1886	Jack, Ernest Sanford - - -	Melrose.
1887	Jeffries, John Amory - - -	Boston.
1887	Jillson, Franklin Campbell - -	Sterling.
1887	Kingman, James Henry - -	New Bedford.
1886	Kite, John Alban - - - -	Nantucket.
1887	Learned, William Turell - -	Fall River.
1886	Lewis, Edwin Ransome, Jr. -	Boston.
1887	Lunney, George - - - -	Malden.
1886	McDonough, Lawrence John -	Lowell.
1886	McGannon, Thomas Gerald - -	Lowell.
1886	McGlynn, Edward - - -	Roxbury.
1886	Murray, Joseph Howe - -	Jamaica Plain.
1886	Newhall, Herbert William - -	Lynn.
1886	Newhall, Lawrence Thompson -	Brookfield.
1887	Norwood, Ephraim Wood - -	Spencer.
1887	O'Brien, Owen Saint-Clare - -	Rockport.
1886	O'Shea, Joseph Francis - -	Lynn.
1887	Palardy, Joseph Hector - -	West Gardner.
1887	Parsons, Frank Sears - - -	Dorchester.
1887	Pierce, Frank Benneville - -	Holyoke.
1886	Pierce, Willard Henry - - -	Bernardston.
1886	Pigeon, James Cogswell DuMaresque	Roxbury.
1887	Poirier, Emile - - - -	Salem.
1886	Pomeroy, William Henry - -	Springfield.
1886	Pope, Caroline Augusta - -	Boston.
1886	Pope, Emily Frances - - -	Boston.
1887	Pope, Frank Fletcher - - -	Roslindale.
1886	Prescott, William Herbert - -	Boston.

1886	Ryan, Dennis Matthew - -	Ware.
1887	Scudder, Charles Locke - -	Boston.
1887	Smith, Frank Llewellyn - -	Sheffield.
1886	Smith, Herbert Llewellyn - -	Boston.
1887	Smith, Mary Almira - - -	Boston.
1886	Stone, Frank Ellsworth - -	Lynn.
1887	Swallow, Edward Emerson - -	Waltham.
1886	Sweeney, Arthur Ambrose - -	Lawrence.
1887	Symonds, Benjamin Ropes, Jr. -	Salem.
1887	Thayer, Samuel Chase - - -	Boston.
1886	Thissell, Joseph Abbott - -	Boston.
1887	Tracy, Albert Francis - - -	Westfield.
1887	Tracy, Thomas Henry - - -	Springfield.
1887	Tracy, William James - - -	Westfield.
1886	Wakefield, Albert Tolman - -	Sheffield.
1886	Wallace, Frank Huron - -	Dorchester.
1886	Ward, George Otis - - -	Boston.
1887	Warriner, Myron Anson - -	No. Brookfield.
1887	Warren, William Barnard - -	Groton.
1886	Whitney, Charles Melville - -	Boston.
1887	Wilbur, Sarah Mann - - -	Palmer.
1887	Williams, Charles Crosby - -	Boston.

Total, 98.

List of Deceased Fellows.

Admitted.	Name.	Residence.	Date of Death.	Age.
1843	ALLEN, CHARLES HASTINGS	Chicago, Ill.	July 27, 1886	77
1880	BENNETT, JOHN LANG	Wollaston	Sept. 13, 1886	35
1863	BROWN, FREDERIC DAVIS	Webster	Nov. 8, 1886	62
1858	CHASE, PRESTON MARSHALL	Danvers	Jan. 4, 1887	59
1843	CODMAN, WILLARD WILD	Boston	Dec. 22, 1886	75
1881	DURGIN, FRANK ALBERT	Salem	Nov. 4, 1886	31
1867	EMERSON, JOHN SHERMAN	Lynn	Sept. 23, 1886	54
1847	FLINT, JOHN SYDENHAM	Roxbury	April 16, 1887	63
1867	FULTON, JOHN BEVERIDGE	East Boston	March 19, 1887	52
1881	*GAMGEE, JOSEPH SAMPSON	Birmingh'm, Eng.	Sept. 18, 1886	58
1835	GORDON, WILLIAM ALEXANDER	New Bedford	Jan. 14, 1887	78
1840	HAMMOND, JOSIAH STURTEVANT	Plympton	Nov. 28, 1886	76
1850	HOMANS, CHARLES DUDLEY	Boston	Sept. 2, 1886	60
1850	LEONARD, MARCUS BLOOMFIELD	East Boston	May 6, 1887	66
1882	MAGEE, ANTHONY BERNARD	Lawrence	Jan. 31, 1887	35
1831	MARSHALL, JONAS AUGUSTUS	Fitchburg	Feb. 25, 1887	86
1848	PARKS, LUTHER	Boston	Nov. 19, 1886	63
1867	PRATT, GUSTAVUS PERCIVAL	Cohasset	April 29, 1887	47
1881	SCULLY, FRANCIS PATRICK	Portland, Me.	Nov. 12, 1886	31
1874	SMITH, JOSHUA VINCENT	Melrose	April 18, 1887	41
1861	STONE, SILAS EMLYN	Walpole	Jan. 29, 1887	48
1851	TAYLOR, ASHMUN HINCKLEY	Shelburne Falls	April 13, 1880	64
1881	WAKEFIELD, ALLEY TALBOT	Cambridgeport	Oct. 18, 1886	31
1856	WAKEFIELD, JONAS FRANKLIN	Everett	Jan. 14, 1887	62
1846	WARREN, GEORGE AUGUSTUS	Hopkinton	May 6, 1887	68
1849	WEST, JOSEPH THOMAS ODIORNE	Princeton	Jan. 28, 1887	63
1886	WOODBURY, FREDERIC CLINTON	Boston	Dec. 4, 1886	25
1872	YATES, EUGENE STEPHEN	Lawrence	July 28, 1886	40

* Honorary. Total, 28.

The Treasurer, Dr. Draper, read his annual report.

Dr. E. H. Bradford moved, in behalf of the Suffolk District Medical Society, that a committee of three be appointed by the chair, with full powers to investigate the subject of Physical Culture in the Schools, and to report on the same at a future meeting of the Society.

The motion was adopted, and the following were appointed to constitute the Committee:

Drs. Z. B. Adams, of Framingham; E. H. Bradford, of Boston; C. F. Withington, of Roxbury.

Papers were read as follows:

9. A CONTRIBUTION TO THE STUDY OF THE ETIOLOGY OF THE SUMMER DIARRHŒA OF INFANTS.—By Henry C. Haven, M.D., of Boston.

10. Sepsis and Antisepsis in Summer Diarrhœa.—By S. Allen Potter, M.D., of Roxbury. Drs. Haven and Millard made remarks upon this paper.

11. Training Nurses.—By Alfred Worcester, M.D., of Waltham. Dr. Channing spoke on this paper.

12. The Value of Public Health Measures to the State.—By Samuel W. Abbott, M.D., of Wakefield. Drs. Bowditch, Cowles and Miller discussed this paper.

The following Delegates were introduced and presented the greetings of their respective State Medical Societies:

Maine.—Dr. W. K. Oakes.
Vermont.—Dr. N P. Wood.
Connecticut.—Dr. W. T. Browne.
New York.—Dr. D. Lewis.
New Jersey.—Dr P. A. Harris.

At 12 o'clock the Annual Discourse was delivered by Dr. George J. Townsend, of South Natick.

At the close of the oration a vote of thanks was presented to the orator for his timely, truthful, suggestive and exceedingly complimentary address.

At 1, p.m., the Society adjourned to the Winslow Skating Rink, where the eighty-sixth annual dinner, presided over by the Anniversary Chairman, Dr. William L. Richardson, was served to about eight hundred Fellows and invited guests.

FRANCIS W. GOSS,
Recording Secretary.

TREASURER'S REPORT.

The following report of the Society's finances for the year ending April 15, 1887, is respectfully submitted.

Balance from last account	$1767 37
Receipts from all other sources during year	8748 84
	10516 21
Expenses	8201 00
Balance on hand	$2315 21

The accompanying statement presents these receipts and disbursements in fuller detail.

The Society's invested funds have remained unchanged; they amount to $32,420.17, and yield interest at the rate of three and four-fifths per cent.

Assessment-dues to the amount of fifty-five dollars have been remitted, by vote of the Councillors, upon the recommendation of the Committee on Membership and Finances. Twelve members of the Society have lost their membership by removal from Massachusetts and neglect of their assessment obligations. Since the last annual meeting, the names of four Fellows have been dropped from the rolls, with the approval of the Council, in accordance with the By-Laws, for five years' delinquency in the payment of their dues.

The Society has the names of 1644 Fellows on its membership-list.

F. W. DRAPER,
Treasurer.

Boston, June 2, 1887.

The Committee appointed at the February meeting to audit the Treasurer's accounts, have carefully attended to their duty, and respectfully report that they find the accounts properly vouched and correctly cast.
The balance on hand is $2,315.21.
The invested funds correspond with the schedule exhibited, and amount to $32,420.17.

A. L. MASON, ⎫ *Auditing*
ALBERT WOOD, ⎭ *Committee.*

Boston, May 20, 1887.

DR. F. W. Draper, Treasurer, in account with

INCOME.

Balance from last account		$1767 37
Assessments paid to the Treasurer		1540 00
Assessments collected by District Treasurer:—		
Barnstable	$95 00	
Berkshire	180 00	
Bristol North	135 00	
Bristol South	180 00	
Essex North	280 00	
Essex South	385 00	
Franklin	105 00	
Hampden	290 00	
Hampshire	165 00	
Middlesex East	140 00	
Middlesex North	350 00	
Middlesex South	345 00	
Norfolk	550 00	
Norfolk South	130 00	
Plymouth	95 00	
Suffolk	1730 00	
Worcester	545 00	
Worcester North	140 00	
		5840 00
Interest account:—		
General Fund	450 12	
Phillips Fund	400 00	
Shattuck Fund	366 67	
Cotting Fund	70 00	
Interest on cash-balance in Savings Banks	71 05	
		1357 84
Extra Dinner Tickets sold June 9, 1886		11 00
		$10,516 21

the Massachusetts Medical Society. Cr.

Expenses.

On account of Annual Meeting, 1886:—		
Caterer's bill	$1820 75	
Cigars	72 00	
Incidentals	58 02	
Music	105 00	
Printing	24 37	
Rent of Dining Hall	150 00	
		$2230 14
Committee on Ethics and Discipline, for mileage		10 60
Committee on Medical Diplomas:—		
Postage and Clerk hire	24 50	
Printing	7 50	
		32 00
Committee on Publications:—		
Braithwaite's Retrospect	2372 50	
Printing Annual Publications, 1886	533 64	
Wood Cuts for Annual Publications	6 00	
		2912 14
Committee (special) on Public Health Legislation, incidental expenses		5 25
Corresponding Secretary, for printing and postage		2 01
Councillors' Orders:—		
Lunches at Stated Meetings (paid by income of Cotting Fund)		58 00
District Societies' Account:—		
Censors-at-large, for advertising meetings, printing and postage	37 79	
Censors' fees for examining candidates for Fellowship	240 00	
Dividend, 1886	1000 00	
District Treasurers' collection fees and expenses	325 68	
		1603 47
Librarian's Expenses:—		
Allowance for Clerk	50 00	
Incidentals	14 70	
Postage and express charges	343 56	
Printing	6 75	
		415 01
Recording Secretary's Expenses:—		
Postage and printing	109 50	
Salary	250 00	
		359 50
Rent to January 1, 1887		150 00
Treasurer's Expenses:—		
Postage and printing	16 13	
Salary	400 00	
Stationery	6 75	
		422 88
		8201 00
Balance to new account		2315 21
		$10,516 21

Officers of the Massachusetts Medical Society.

1887—1888.

CHOSEN JUNE 7, 1887.

THOMAS H. GAGE, .	. Worcester,	. PRESIDENT.
WILLIAM G. BRECK,	. Springfield,	. VICE-PRESIDENT.
FRANK W. DRAPER,	. Boston, .	. TREASURER.
CHARLES W. SWAN,	. Boston, .	. COR. SECRETARY.
FRANCIS W. GOSS, .	. Roxbury, .	. REC. SECRETARY.
EDWIN H. BRIGHAM,	. Boston, .	. LIBRARIAN.
B. JOY JEFFRIES, .	. Boston, .	. ORATOR.
CHARLES B. PORTER,	. Boston, .	. ANNIV. CHAIRMAN.

Standing Committees.

Of Arrangements.

J. B. SWIFT, O. K. NEWELL,
H. C. ERNST, V. Y. BOWDITCH,
W. W. GANNETT, F. B. HARRINGTON.

On Publications.

G. C. SHATTUCK, R. M. HODGES, B. E. COTTING.

On Membership and Finances.

F. MINOT, B. S. SHAW, D. W. CHEEVER,
J. STEDMAN, E. G. CUTLER.

To Procure Scientific Papers.

C. W. SWAN, G. S. STEBBINS, J. R. CHADWICK,
R. H. FITZ, H. P. WALCOTT.

On Ethics and Discipline.

G. J. TOWNSEND, G. E. FRANCIS, A. H. JOHNSON,
C. HOWE, F. C. SHATTUCK.

On Medical Diplomas.

W. L. RICHARDSON, A. H. COWDREY, E. J. FORSTER.

Presidents of District Societies—Vice-Presidents (Ex-Officiis).

(Arranged according to Seniority.)

N. B. Edwards,	E. P. Hurd,
J. Homans,	W. P. Bolles,
S. W. Driver,	G. C. Webber,
S. D. Presbrey,	T. R. Clement,
T. F. Breck,	S. W. Kelley,
C. H. Rice,	A. M. Tupper,
C. D. Prescott,	W. M. Wright,
C. Seymour,	J. H. Robbins,
H. F. Borden,	F. P. Whittlesey.

Councillors.

Barnstable.—Drs. G. W. Doane, Hyannis; G. N. Munsell, Harwich; S. Pitcher, Hyannis.

Berkshire.—Drs. J. F. A. Adams, Pittsfield; C. W. Burton, Adams; H. J. Millard, North Adams; J. L. Miller, Sheffield; G. H. Race, West Stockbridge; A. M. Smith, Williamstown.

Bristol North.—Drs. A. S. Deane, F. A. Hubbard, Taunton; G. Mackie, Attleboro'; J. Murphy, Taunton; J. E. Totten, Attleboro'.

Bristol South.—Drs. E. P. Abbé, New Bedford; S. W. Bowen, Fall River; S. W. Hayes, New Bedford; J. H. Jackson, Fall River; C. D. Prescott, J. J. B. Vermyne, New Bedford; J. B. Whitaker, Fall River.

Essex North.—Drs. F. H. Allen, Haverhill; C. N. Chamberlain, H. M. Chase, Lawrence; H. J. Cushing, Merrimac; F. A. Howe, Newburyport; O. H. Johnson, Haverhill; G. Montgomery, Newburyport; R. B. Root, Georgetown; L. A. Woodbury, Groveland.

Essex South.—Drs. C. Burnham, Lynn; D. Choate, D. Coggin, Salem; H. Colman, Lynn; A. S. Garland, Gloucester; W. A. Gorton, Danvers; Y. G. Hurd, Ipswich; T. Kittredge, Salem; C. A. Lovejoy, Lynn; T. L. Perkins, Salem; C. C. Pike, Peabody.

Franklin.—Drs. F. J. Canedy, Shelburne Falls; E. A. Deane, Montague; G. R. Fessenden, Ashfield; J. H. Goddard, Orange.

HAMPDEN.—Drs. L. S. Brooks, Springfield; G. E. Fuller, Monson; W. Holbrook, Palmer; G. C. McClean, Springfield; F. F. Parker, Chicopee; A. R. Rice, G. S. Stebbins, Springfield; J. H. Waterman, Westfield.

HAMPSHIRE.—Drs. O. F. Bigelow, Amherst; J. Dunlap, J. M. Fay, B. D. Sheedy, Northampton; J. Yale, Ware.

MIDDLESEX EAST.—Drs. F. F. Brown, Reading; A. H. Cowdrey, Stoneham; C. C. Odlin, Melrose; W. F. Stevens, Stoneham.

MIDDLESEX NORTH.—Drs. W. Bass, Lowell; C. Dutton, Tyngsboro'; N. B. Edwards, North Chelmsford; C. M. Fisk, J. H. Gilman, Lowell; W. F. Heald, Pepperell; J. C. Irish, W. H. Lathrop, A. W. Lavigne, F. Nickerson, F. C. Plunkett, Lowell.

MIDDLESEX SOUTH.—Drs. Z. B. Adams, Framingham; C. H. Cook, Natick; T. Crozier, Charlestown; E. R. Cutler, Waltham; W. W. Dow, Somerville; H. M. Field, Newton; E. J. Forster, Charlestown; J. L. Hildreth, Cambridge; R. L. Hodgdon, Arlington; H. Holmes, Lexington; A. F. Holt, Cambridgeport; A. Hosmer, Watertown; O. E. Hunt, Newtonville; A. C. Livermore, Stow; G. C. Pierce, Ashland; E. H. Stevens, North Cambridge; J. L. Sullivan, Malden; J. B. Taylor, East Cambridge; G. J. Townsend, South Natick; H. P. Walcott, Cambridge; A. C. Webber, W. W. Wellington, Cambridgeport; M. Wyman, Cambridge.

NORFOLK.—Drs. G. O. Allen, West Roxbury; C. A. Bemis, West Medway; N. Call, Roxbury; J. W. Chase, Dedham; G. W. Clement, E. L. Farr, Roxbury; W. C. B. Fifield, Dorchester; E. P. Gerry, Jamaica Plain; A. D. Kingsbury, Needham; G. E. Mecuen, Roxbury; O. F. Rogers, Dorchester; G. K. Sabine, Brookline; H. R. Stedman, Roslindale; G. D. Townshend, C. F. Withington, Roxbury.

NORFOLK SOUTH.—Drs. J. A. Gordon, Quincy; F. C. Granger, Randolph; J. W. Spooner, Hingham.

PLYMOUTH.—Drs. J. H. Averill, Campello; J. B. Brewster, Plymouth; H. W. Dudley, Abington; J. C. Gleason, Rockland; B. F. Hastings, Whitman; A. E. Paine, Brockton.

SUFFOLK.—Drs. S. L. Abbot, J. Ayer, H. J. Barnes, H. J. Bigelow, C. J. Blake, H. I. Bowditch, E. H. Bradford, F. E. Bundy, J. S. F. Bush, A. T. Cabot, J. R. Chadwick, D. W. Cheever, J. W. Cushing, H. Derby, O. W. Doe, F. W. Draper, *Treasurer*, S. H. Durgin, T. Dwight, Boston; T. W. Fisher, South Boston; R. H. Fitz, C. F. Folsom, Boston; M. F. Gavin, South Boston; J. O. Green, F. B. Greenough; W. H. H. Hastings, W. C. Holyoke, J. Homans, W. Ingalls, B. J. Jeffries, G. F. Jelly, F. I. Knight, G. H. Lyman, A. E. McDonald, F. Minot, C. B. Porter, A. Post, J. P. Reynolds, W. L. Richardson, G. C. Shattuck, B. S. Shaw, A. D. Sinclair, A. M. Sumner, C. W. Swan, *Corresponding Secretary*, G. G. Tarbell, O. F. Wadsworth, J. C. Warren, Boston; A. P. Weeks, Chelsea; J. C. White, E. N. Whittier, E. Wigglesworth, H. W. Williams, Boston.

WORCESTER.—Drs. A. G. Blodgett, West Brookfield; G. Brown, Barre; W. Davis, G. E. Francis, T. H. Gage, *President*, Worcester; E. B. Harvey, Westboro'; J. O. Marble, Worcester; G. M. Morse, Clinton; J. G. Park, J. M. Rice, Worcester; W. E. Rice, North Grafton; E. Warner, L. Wheeler, A. Wood, Worcester.

WORCESTER NORTH.—Drs. R. F. Andrews, Gardner; G. D. Colony, Fitchburg; J. R. Greenleaf, Jr., Gardner; B. H. Hartwell, Ayer; F. H. Thompson, Fitchburg.

Censors.

BARNSTABLE.—Drs. C. H. Call, South Yarmouth; B. D. Gifford, Chatham; F. W. Pierce, Marston's Mills; J. E. Pratt, Sandwich; C. W. Whitaker, Yarmouthport.

BERKSHIRE.—Drs. W. W. Leavitt, Pittsfield; E. E. Mather, Williamstown; F. K. Paddock, Pittsfield; A. T. Wakefield, Sheffield; D. M. Wilcox, Lee.

BRISTOL NORTH.—Drs. C. A. Atwood, Taunton; J. B. Gerould, North Attleboro'; M. C. Golden, J. B. Murphy, M. Perry, Taunton.

BRISTOL SOUTH.—Drs. A. J. Abbé, Fall River; C. A. Gould,

Central Village; G. DeN. Hough, W. N. Swift, W. H. Taylor, New Bedford.

Essex North.—Drs. J. Crowell, Haverhill; F. B. Flanders, Lawrence; R. C. Huse, Georgetown; A. F. Shea, Lawrence; J. F. Young, Newburyport.

Essex South.—Drs. F. S. Atwood, Salem; C. W. Haddock, Beverly; J. Kittredge, Marblehead; C. C. Sheldon, Lynn; C. G. Weston, Peabody.

Franklin.—Drs. E. G. Best, Turner's Falls; F. J. Canedy, Shelburne Falls; F. H. Drew, J. B. Laidley, Conway; A. C. Walker, Greenfield.

Hampden.—Drs. M. Calkins, C. P. Hooker, Springfield; J. C. Hubbard, Holyoke; S. F. Pomeroy, Springfield.

Hampshire.—Drs. C. M. Barton, Hatfield; H. H. Seelye, Amherst; B. D. Sheedy, G. D. Thayer, W. M. Trow, Northampton.

Middlesex East.—Drs. J. P. Bixby, North Woburn; D. March, Jr., Winchester; G. W. Nickerson, Stoneham; P. Sheldon, Wakefield; F. Winsor, Winchester.

Middlesex North.—Drs. H. P. Jefferson, H. S. Johnson, J. J. McCarty, G. E. Pinkham, C. P. Spalding, Lowell.

Middlesex South.—Drs. W. A. Bell, Somerville; E. Farnham, J. T. G. Nichols, Cambridge; F. W. Taylor, North Cambridge; A. Worcester, Waltham.

Norfolk.—Drs. H. W. Broughton, Jamaica Plain; S. M. Crawford, Roxbury; H. C. Ernst, Jamaica Plain; F. W. Vogel, H. W. White, Roxbury.

Norfolk South.—Drs. S. M. Donovan, Quincy; J. C. Fraser, East Weymouth; C. E. Prior, Holbrook; G. W. Tinkham, Weymouth; C. C. Tower, South Weymouth.

Plymouth.—Drs. E. A. Chase, W. P. Chisholm, Brockton; E. D. Hill, Plymouth; F. J. Ripley, Brockton; F. G. Wheatley, North Abington.

Suffolk.—Drs. E. G. Cutler, C. M. Green, J. H. McCollom, T. M. Rotch, F. H. Williams, Boston.

WORCESTER.—Drs. W. P. Bowers, Clinton; O. H. Everett, H. S. Knight, C. A. Peabody, Worcester; J. Wilmarth, Upton.

WORCESTER NORTH.—Drs. C. H. Bailey, South Gardner; C. E. Bigelow, E. J. Cutter, Leominster; S. E. Greenwood, Templeton; H. H. Lyons, Fitchburg.

Commissioners of Trials.

BARNSTABLE	W. N. Stone	Wellfleet.
BERKSHIRE	A. M. Smith	Pittsfield.
BRISTOL NORTH	J. P. Brown	Taunton.
BRISTOL SOUTH	S. W. Bowen	Fall River.
ESSEX NORTH	F. A. Howe	Newburyport.
ESSEX SOUTH	E. Newhall	Lynn.
FRANKLIN	C. Bowker	Bernardston.
HAMPDEN	A. O. Squier	Holyoke.
HAMPSHIRE	W. Dwight	North Amherst.
MIDDLESEX EAST	S. W. Abbott	Wakefield.
MIDDLESEX NORTH	W. M. Hoar	Lowell.
MIDDLESEX SOUTH	E. J. Forster	Charlestown.
NORFOLK	J. Stedman	Jamaica Plain.
NORFOLK SOUTH	C. E. Prior	Holbrook.
PLYMOUTH	A. Millet	East Bridgewater.
SUFFOLK	C. W. Swan	Boston.
WORCESTER	J. H. Robinson	Southboro'.
WORCESTER NORTH	A. L. Stickney	Ashburnham.

Officers of the District Medical Societies.

BARNSTABLE.—Dr. T. R. Clement, Osterville, *President;* Dr. S. Pitcher, Hyannis, *Vice-President;* Dr. F. A. Rogers, Brewster, *Secretary;* Dr. C. M. Hulbert, South Dennis, *Treasurer.*

BERKSHIRE.—Dr. E. P. Whittlesey, Great Barrington, *President;* Dr. C. L. Hubbell, Williamstown, *Vice-President;* Dr. H. Colt, Jr., Pittsfield, *Secretary;* Dr. W. M. Mercer, Pittsfield, *Treasurer;* Dr. W. L. Paddock, Pittsfield, *Librarian.*

BRISTOL NORTH.—Dr. S. D. Presbrey, Taunton, *President;* Dr. W. S. Robinson, Taunton, *Vice-President;* Dr. M. Perry, Taunton, *Secretary;* Dr. P. W. Hewins, Taunton, *Treasurer;* Dr. E. J. Bassett, Taunton, *Librarian.*

BRISTOL SOUTH.—Dr. C. D. Prescott, New Bedford, *President;* Dr. G. S. Eddy, Fall River, *Vice-President;* Dr. W. H. Taylor, New Bedford, *Secretary, Treasurer and Librarian.*

ESSEX NORTH.—Dr. E. P. Hurd, Newburyport, *President;* Dr. C. G. Carleton, Lawrence, *Vice-President;* Dr. M. D. Clarke, Haverhill, *Secretary and Treasurer.*

ESSEX SOUTH.—Dr. A. M. Tupper, Rockport, *President;* Dr. O. B. Shreve, Salem, *Vice-President;* Dr. C. W. Galloupe, Lynn, *Secretary;* Dr. W. Neilson, Salem, *Treasurer;* Dr. L. G. Kemble, Salem, *Librarian.*

FRANKLIN.—Dr. W. M. Wright, Orange, *President;* Dr. C. G. Trow, South Deerfield, *Vice-President;* Dr. A. C. Deane, Greenfield, *Secretary and Treasurer.*

HAMPDEN.—Dr. T. F. Breck, Springfield, *President;* Dr. J. J. O'Connor, Holyoke, *Vice-President;* Dr. G. L. Woods, Springfield, *Secretary, Treasurer and Librarian.*

HAMPSHIRE.—Dr. C. Seymour, Northampton, *President;* Dr. C. W. Cooper, Northampton, *Vice-President;* Dr. B. D. Sheedy, Northampton, *Secretary;* Dr. J. Dunlap, Northampton, *Treasurer;* Dr. G. D. Thayer, Northampton, *Librarian.*

MIDDLESEX EAST.—Dr. S. W. Kelley, Woburn, *President;* Dr. F. W. Graves, Woburn, *Vice-President;* Dr. D. March, Jr., Winchester, *Secretary;* Dr. J. O. Dow, Reading, *Treasurer.*

MIDDLESEX NORTH.—Dr. N. B. Edwards, North Chelmsford, *President;* Dr. H. J. Smith, Lowell, *Vice-President;* Dr. W. G. Eaton, Jr., Lowell, *Secretary;* Dr. W. B. Jackson, Lowell, *Treasurer;* Dr. C. A. Viles, Lowell, *Librarian.*

MIDDLESEX SOUTH.—Dr. S. W. Driver, Cambridge, *President;* Dr. L. R. Stone, Newton, *Vice-President;* Dr. W. Ela, Cambridge, *Secretary;* Dr. J. W. Willis, Waltham, *Treasurer;* Dr. W. A. Winn, Arlington, *Librarian.*

Norfolk.—Dr. W. P. Bolles, Roxbury, *President;* Dr. G. D. Townshend, Roxbury, *Vice-President;* Dr. S. A. Potter, Roxbury, *Secretary and Librarian;* Dr. E. G. Morse, Roxbury, *Treasurer.*

Norfolk South.—Dr. J. H. Robbins, Hingham, *President;* Dr. C. A. Dorr, South Hingham, *Vice-President;* Dr. J. F. Welch, Quincy, *Secretary and Treasurer;* Dr. F. C. Granger, Randolph, *Librarian.*

Plymouth.—Dr. H. F. Borden, Brockton, *President;* Dr. J. B. Brewster, Plymouth, *Vice-President;* Dr. J. E. Bacon, Brockton, *Secretary and Treasurer;* Dr. A. A. MacKeen, Whitman, *Librarian.*

Suffolk.—Dr. J. Homans, Boston, *President;* Dr. G. W. Gay, Boston, *Vice-President;* Dr. H. L. Burrell, Boston, *Secretary;* Dr. E. M. Buckingham, Boston, *Treasurer;* Dr. B. J. Jeffries, Boston, *Librarian.*

Worcester.—Dr. G. C. Webber, Millbury, *President;* Dr. J. M. Rice, Worcester, *Vice-President;* Dr. W. C. Stevens, Worcester, *Secretary;* Dr. S. B. Woodward, Worcester, *Treasurer;* Dr. L. Wheeler, Worcester, *Librarian.*

Worcester North.—Dr. C. H. Rice, Fitchburg, *President;* Dr. J. M. Blood, Ashby, *Vice-President;* Dr. A. P. Mason, Fitchburg, *Secretary;* Dr. E. P. Miller, Fitchburg, *Treasurer;* Dr. F. H. Thompson, Fitchburg, *Librarian.*

Massachusetts Medical Society.

PROCEEDINGS OF THE COUNCILLORS.

October 5, 1887.

A Stated Meeting of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Wednesday, October 5, 1887, at 11 o'clock, A.M.

The President, Dr. Thomas H. Gage, in the chair.

The following Councillors were present:

Berkshire.
J. F. A. Adams.

Bristol North.
F. A. Hubbard.

Bristol South.
S. W. Bowen,
S. W. Hayes.

Essex North.
F. A. Howe.

Essex South.
C. Burnham,
D. Coggin,
H. Colman,
C. A. Lovejoy,
C. C. Pike.

Middlesex East.
F. F. Brown,
A. H. Cowdrey,
C. C. Odlin,
W. F. Stevens.

Middlesex North.
J. H. Gilman,
W. F. Heald,
F. Nickerson.

Middlesex South.
T. Crozier,
E. R. Cutler,
W. W. Dow,
E. J. Forster,
R. L. Hodgdon,
H. Holmes,
O. E. Hunt,
G. C. Pierce,
J. L. Sullivan,
H. P. Walcott,
M. Wyman.

Norfolk.
C. A. Bemis,
N. Call,
E. P. Gerry,
A. D. Kingsbury,
O. F. Rogers,
H. R. Stedman,
C. F. Withington.

Plymouth.
H. W. Dudley,
J. C. Gleason,
B. F. Hastings.

Suffolk.
S. L. Abbot,
H. J. Barnes,
C. J. Blake,
H. I. Bowditch,
E. H. Bradford,
F. E. Bundy,
A. T. Cabot,
D. W. Cheever,
J. W. Cushing,
O. W. Doe,

F. W. Draper,	C. B. Porter,	*Worcester.*
T. W. Fisher,	A. Post,	G. Brown,
R. H. Fitz,	J. P. Reynolds,	W. Davis,
C. F. Folsom,	W. L. Richardson,	T. H. Gage,
F. B. Greenough,	G. C. Shattuck,	E. B. Harvey,
W. H. H. Hastings,	B. S. Shaw,	J. O. Marble,
W. C. Holyoke,	A. M. Sumner,	G. M. Morse,
W. Ingalls,	C. W. Swan,	L. Wheeler.
B. J. Jeffries,	J. C. Warren,	
F. I. Knight,	A. P. Weeks,	*Worcester North.*
F. Minot,	H. W. Williams.	B. H. Hartwell.
		Total, 78.

The record of the previous meeting was read and accepted.

On nomination by the President the following were appointed Delegates to other State Medical Societies:

Vermont.—Drs. R. H. Phelps, of Littleton; O. Martin, of Worcester.

New York.—Drs. H. P. Walcott, of Cambridge; J. C. Irish, of Lowell.

Voted,—That hereafter two delegates be sent annually to the New York State Medical Association.

The Committee on Membership and Finances reported through Dr. Minot. In accordance with their recommendation the following were allowed to resign:

F. Dillon Brown, of New York, N. Y.
George T. Chase, of New York, N. Y.
Charles W. Harwood, of Saco, Me.
Flaville W. Kyle, of Raton, New Mex.
Hannah L. Nichols, of Thompson, Ill.
Arthur C. Pierce, of Corpus Christi, Texas.
John C. Pennington, of Colorado Springs, Col.
Asbury G. Smith, of Cincinnati, Ohio.
Herbert B. Whitney, of Salida, Col.

Also the following were allowed to retire:

William Dwight, of North Amherst.
Rowse R. Clarke, of Whitinsville.

Also the following was dropped from the roll, having

forfeited membership by removal from the State and non-payment of dues:

Frank H. Daniels, of New York, N. Y.

Adjourned at 11.40, A.M.

FRANCIS W. GOSS,
Recording Secretary.

FEBRUARY 1, 1888.

A STATED MEETING of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Wednesday, February 1, 1888, at 11 o'clock, A.M.

The President, Dr. THOMAS H. GAGE, in the chair.

The following Councillors were present:

Bristol South.
S. W. Bowen,
J. J. B. Vermyne.

Essex North.
H. J. Cushing,
F. A. Howe,
G. Montgomery.

Essex South.
C. Burnham,
D. Coggin,
H. Colman,
C. A. Lovejoy,
C. C. Pike.

Hampden.
W. Holbrook.

Middlesex East.
F. F. Brown,
A. H. Cowdrey,
C. C. Odlin,
W. F. Stevens.

Middlesex North.
C. Dutton,
J. H. Gilman,
W. F. Heald,
J. C. Irish,
F. C. Plunkett.

Middlesex South.
Z. B. Adams,
C. H. Cook,
T. Crozier,
E. J. Forster,
H. Holmes,
A. Hosmer,
A. C. Webber,
W. W. Wellington.

Norfolk.
G. W. Clement,
E. P. Gerry,
A. D. Kingsbury,
G. E. Mecuen,
O. F. Rogers,
C. F. Withington.

Norfolk South.
J. A. Gordon,
J. W. Spooner.

Plymouth.
B. F. Hastings,
A. E. Paine.

Suffolk.
H. J. Barnes,
H. I. Bowditch,
E. H. Bradford,
F. E. Bundy,
A. T. Cabot,
J. R. Chadwick,
D. W. Cheever,

J. W. Cushing,
O. W. Doe,
F. W. Draper,
R. H. Fitz,
C. F. Folsom,
M. F. Gavin,
F. B. Greenough,
W. H. H. Hastings,
W. C. Holyoke,
F. I. Knight,
G. H. Lyman,
A. E. McDonald,
F. Minot,
C. B. Porter,
A. Post,
W. L. Richardson,
G. C. Shattuck,
B. S. Shaw,
A. D. Sinclair,
A. M. Sumner,
C. W. Swan,
A. P. Weeks,
E. N. Whittier,
E. Wigglesworth,
H. W. Williams.

Worcester.

G. Brown,
G. E. Francis,
T. H. Gage,
G. M. Morse.

Worcester North.

R. F. Andrews,
J. R. Greenleaf,
B. H. Hartwell.

Total, 77.

The record of the last meeting was read and accepted.

On nomination by the President the following were appointed Delegates to other State Medical Societies:

Maine.—Drs. A. H. Johnson, of Salem; J. O. Marble, of Worcester.

New Hampshire.—Drs. F. W. Draper, of Boston; B. H. Hartwell, of Ayer.

Rhode Island.—Drs. R. L. Hodgdon, of Arlington; G. C. Webber, of Millbury.

Connecticut.—Drs. A. M. Smith, of Williamstown; G. D. Colony, of Fitchburg.

New Jersey.—Drs. A. Hosmer, of Watertown; A. C. Deane, of Greenfield.

On nomination by the President the following Committees were appointed:

To Audit the Treasurer's Accounts.—Drs. A. Wood, S. J. Mixter.

To Examine the By-Laws of District Societies.—Drs. S. D. Presbrey, J. C. White, F. W. Chapin.

The Committee on Membership and Finances reported through Dr. Minot. In accordance with their recommendation the following were allowed to resign:

Flavel S. Thomas, of Hanson.
George A. Willey, of Oxford.
Charles H. Williams, of Chicago, Ill.

Also the following was allowed to retire:

Royal S. Warren, of Colorado Springs, Col.

Also the following were dropped for non-payment of dues:

Charles H. Crawford, of Hollister, Cal.
Eliphalet Wright, of Lee.

The Committee on Medical Diplomas, to which was referred the question of Fellowship in the Society as embraced in By-Laws I. and II., reported through Dr. Richardson, and recommended the repeal of the following sections of the concurrent vote of the Councillors and Society passed October 7, 1874. (By-Laws, etc., pp. 27, 28.)

That tickets or diplomas of Botanic, Eclectic or Homœopathic colleges, or of colleges devoted to any peculiar or exclusive system of medicine, are considered irregular, and will not be recognized under any circumstances;

And, That certificates from teachers who practise any peculiar or exclusive system of medicine, who advertise, or who violate in any way the code of ethics adopted by the profession in this State, will not be taken, even though the teacher himself be a regular graduate in medicine.

The report of the Committee was accepted and its recommendations were adopted.

The Committee appointed at the last meeting "to consider the question of arranging meetings of Sections of the Society in some of the departments of medicine at the time of the annual meeting," reported through Dr. Bradford, and presented the following recommendations, which were adopted:

That, beginning with the annual meeting in 1889, the hours of the afternoon session of the first day be occupied by meetings in Sections of Medicine, Surgery, and Obstetrics.

That the Committee to Procure Scientific Papers arrange for the organization of the above-named Sections, and, in preparation of the meeting, select topics of interest, and such as are capable of general discussion in their appropriate Section.

That the President be requested, in nominating the Committee to Procure Scientific Papers, to select its members with reference to the formation of these Sections.

That the Committee on Publications be requested to consider the advisability of providing for accurate reports of the discussions which follow the reading of the papers presented in the Sections.

The following were restored to Fellowship in the Society:

Whitmell Pugh Small, of Great Barrington.
Frederic James Sanborn, of Spencer.

Adjourned at 12.20, P.M.

FRANCIS W. GOSS,
Recording Secretary.

JUNE 12, 1888.

THE ANNUAL MEETING of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Tuesday, June 12, 1888, at 7 o'clock, P.M.

The President, Dr. THOMAS H. GAGE, in the chair.

The following Councillors were present:

Barnstable.
G. W. Doane,
G. N. Munsell,
S. Pitcher.

Bristol North.
A. S. Deane,
F. A. Hubbard.

Bristol South.
S. W. Bowen,
S. W. Hayes,
J. H. Jackson.

Essex North.
C. N. Chamberlain,
J. Crowell,
G. Montgomery,
L. J. Young.

Essex South.
J. Allen,
C. A. Carlton,
I. F. Galloupe,
J. E. Garland,
J. W. Goodell,
F. E. Hines,
E. A. Kemp.

Hampden.
G. C. McClean.

Hampshire.
F. Tuckerman.

Middlesex East.
J. P. Bixby,
A. H. Cowdrey,
C. C. Odlin,
W. F. Stevens.

Middlesex North.
W. Bass,
N. B. Edwards,
J. H. Gilman,
W. H. Lathrop.

Middlesex South.
C. H. Cook,
T. Crozier,
W. W. Dow,
E. J. Forster,
R. L. Hodgdon,
H. Holmes,
A. F. Holt,
A. Hosmer,
G. C. Pierce,
J. L. Sullivan,
J. B. Taylor,
G. J. Townsend,
H. P. Walcott,
A. C. Webber,
W. W. Wellington,
J. W. Willis.

Norfolk.
J. W. Chase,
G. W. Clement,
B. Cushing,
E. F. Dunbar,
H. C. Ernst,
W. S. Everett,
D. S. Fogg,
E. P. Gerry,
A. D. Kingsbury,
G. K. Sabine,
H. R. Stedman,
C. F. Withington.

Norfolk South.
J. A. Gordon,
J. W. Spooner.

Plymouth.
A. Millet,
A. E. Paine.

Suffolk.
S. L. Abbot,
H. J. Barnes,
F. E. Bundy,
J. F. S. Bush,
D. W. Cheever,
J. W. Cushing,
F. W. Draper,
T. Dwight,
T. W. Fisher,
R. H. Fitz,
C. F. Folsom,
J. O. Green,
F. B. Greenough,
W. C. Holyoke,
J. Homans,
W. Ingalls,
B. J. Jeffries,
G. F. Jelly,
F. I. Knight,
G. H. Lyman,
A. E. McDonald,
F. Minot,
C. B. Porter,
J. P. Reynolds,
W. L. Richardson,
T. M. Rotch,
G. C. Shattuck,
B. S. Shaw,
A. D. Sinclair,
A. M. Sumner,
C. W. Swan,
O. F. Wadsworth,
J. C. Warren,
A. P. Weeks,
J. C. White,
E. N. Whittier,
E. Wigglesworth,
H. W. Williams.

Worcester.
A. G. Blodgett,
T. H. Gage,
E. B. Harvey,
W. H. Lincoln,
J. M. Rice.

Worcester North.
R. F. Andrews,
G. D. Colony,
J. R. Greenleaf,
B. H. Hartwell,
G. Jewett.

Total, 109.

The record of the previous meeting was read and accepted.

The Secretary read the names of new and of deceased Fellows.

The Treasurer, Dr. Draper, read his annual report.

The Auditing Committee reported that they found the accounts properly vouched and correctly cast, and that the Society's invested funds corresponded with the schedule exhibited.

The Treasurer's report was then accepted.

The Committee on Membership and Finances reported through Dr. Minot and recommended that one half the surplus in the treasury, amounting to $1257.85, be distributed among the District Societies.

The recommendation of the Committee was adopted.

On recommendation by the same Committee it was voted that the following be allowed to resign:

Edward F. Hodges, of Indianapolis, Ind.
George W. Perkins, of Omaha, Neb.
Charles E. Taft, of Hartford, Conn.

Also that the following be placed on the retired list:

Franklin Bonney, of Hadley.
Daniel V. Folts, of East Boston.
William Mack, of Salem.
Miles Spaulding, of Groton.
Joseph H. Streeter, of Roxbury.
Ephraim L. Warren, of Melrose.

Also that the following be restored to Fellowship:

James Orne Whitney, of Pawtucket, R. I.

The Committee on Publications reported through Dr. Shattuck as follows:—

The late Dr. George C. Shattuck by his last will and testament gave a fund to the Society directing that the net income of the same shall be applied from time to time in the discretion of said Society or of its government, to the collection and publication annually by some suitable person, of historical or other essays on the climate of the Commonwealth, or on the diseases of its inhabitants, and on such other subjects as the said Society or its government may select.

In 1877, the Council directed the Committee to offer prizes for essays from this fund; and the first year four essays were handed in, three of them of such merit that it was very difficult to select the one to the writer of which the prize should be assigned. Subsequently no essays worthy of a prize were offered.

Three years and a half ago the Council authorized the Committee on Publications to offer, in accordance with the terms of

the Shattuck bequest, a prize of one thousand dollars for an essay worthy of a prize; all essays to be handed in on or before March 1, 1888. Only three essays were received, and no one of them was deemed worthy of a prize.

From this experience, and from the experience of members serving on other committees for awarding prizes, the Committee unanimously voted to submit these resolutions to the Councillors:

Resolved, That the Committee on Publications be instructed to provide for a lecture, to be called the Shattuck Lecture, on some subject in accordance with what is specified in the will of the late Dr. Shattuck, the lecture to be delivered at the annual meeting of the Society, the honorarium for it and the publication of it to be defrayed from the income of the Shattuck Fund.

Resolved, That the income of the Shattuck Fund not required for the expenses of the lectureship shall be used for the printing of the Medical Communications of the Society.

It was voted that the report of the Committee be accepted, and that the appended resolutions be adopted.

It was also voted that the Committee be not restricted to members of the Society, but have full powers to select such lecturers as they see fit.

The Committee on By-Laws of the District Societies, and the Librarian, Dr. Brigham, presented their reports.

Voted,—That the next Annual Meeting of the Society be held in Boston, on the second Wednesday in June, 1889.

The Committee on Nominations reported a list of candidates for the offices of the Society for the ensuing year, and the same were elected by ballot:

President . .	Dr. David W. Cheever, of Boston.
Vice President . .	Dr. George Jewett, of Fitchburg.
Treasurer . .	Dr. Frank W. Draper, of Boston.
Corresponding Secretary	Dr. Charles W. Swan, of Boston.
Recording Secretary .	Dr. Francis W. Goss, of Roxbury.
Librarian . .	Dr. Edwin H. Brigham, of Boston.

Dr. Henry P. Walcott, of Cambridge, was chosen Orator, and

Dr. James R. Chadwick, of Boston, Anniversary Chairman, for the Annual Meeting of the Society in 1889.

On nomination by the President, the following Standing Committees were appointed:

Of Arrangements.

H. C. Ernst, V. Y. Bowditch, H. L. Burrell,
O. K. Newell, F. B. Harrington, R. W. Lovett.

On Publications.

G. C. Shattuck, R. M. Hodges, B. E. Cotting.

On Membership and Finances.

F. Minot, B. S. Shaw, J. Stedman,
E. G. Cutler, L. R. Stone.

To Procure Scientific Papers.

H. P. Walcott, E. H. Bradford, C. M. Green,
C. W. Cooper, S. B. Woodward, L. Wheeler.

On Ethics and Discipline.

G. J. Townsend, G. E. Francis, A. H. Johnson,
C. Howe, F. C. Shattuck.

On Medical Diplomas.

W. L. Richardson, A. H. Cowdrey, E. J. Forster.

Adjourned at 8.30, P.M.

FRANCIS W. GOSS,
Recording Secretary.

Massachusetts Medical Society.

PROCEEDINGS OF THE SOCIETY.

ANNUAL MEETING.

First Day.

The Society met in Huntington Hall, Institute of Technology, Boston, on Tuesday, June 12, 1888, at 2 o'clock, P.M.

The President, Dr. Thomas H. Gage, in the chair.

The following papers were read:

1. Private Mental Sanitaria and the Inebrieties.—By Austin W. Thompson, M.D., of Northampton. Drs. E. Cowles and W. Channing, and Dr. Bancroft of Concord, N. H., discussed this paper.

2. Therapeutic Nihilism.—By Maurice D. Clarke, M.D., of Haverhill. Drs. F. H. Williams and E. P. Hurd made remarks upon this paper.

3. Uterine Displacements and their Influence on the General Nervous System.—By Francis H. Davenport, M.D., of Boston. Dr. G. H. Lyman spoke upon this paper.

4. The Modern Practice of Surgery.—By Otis K. Newell, M.D., of Boston.

5. A Study of Phthisis and Pneumonia in Massachusetts; Statistical and Climatological.—By W. Everett Smith, M.D., of Boston.

6. The Treatment of Hypertrophy of the Prostate with Especial Reference to Operative Measures.—By Francis S. Watson, M.D., of Boston.

Adjourned at 6, P.M.

FRANCIS W. GOSS,
Recording Secretary.

Second Day.

The Society met in Huntington Hall, Boston, on Wednesday, June 13, 1888, at 9 o'clock, A.M., for the exercises of the one hundred and seventh Anniversary.

The President, Dr. Thomas H. Gage, in the chair.

The record of the last annual meeting was read and accepted.

The Secretary read the names of Fellows admitted since the last annual meeting, and of Fellows whose deaths had been reported.

Fellows admitted since June 7, 1887.

1887	Austin, Arthur Everett - -	Dorchester.
1888	Babcock, James Woods - -	Somerville.
1888	Baldwin, Frederic William - -	Danvers.
1887	Bechtinger, Josef - - -	Boston.
1888	Blair, Arthur Walter - - -	Dorchester.
1887	Bowen, John Templeton - -	Boston.
1887	Brennan, John Joseph - -	Worcester.
1887	Bryant, William Sohier - -	Boston.
1888	Bunker, Frederic Story - -	Boston.
1888	Cilley, Daniel Plummer, Jr. -	Westboro'.
1888	Clarke, Israel James - - -	Haverhill.
1887	Cochrane, John - - - -	Lowell.
1887	Cogan, Joseph Ambrose - -	Brighton.
1888	Copp, Owen - - - -	Taunton.
1887	Cowles, William Norman - -	Ayer.
1887	Curtis, Francis George - -	Newton Centre.
1887	Cutts, Harry Madison - -	Brookline.
1888	Davis, Ella Maxfield - - -	Holyoke.
1887	Donovan, Benedict - - -	Brockton.
1887	Dow, Edmund Scott - - -	Allston.
1888	Dunne, Alexander John - -	Springfield.
1887	Earle, Bessie Cornelia - -	Worcester.
1887	Ehrlich, Henry - - - -	Boston.
1887	Fox, William Yale - - -	Boston.
1887	Francis, George Hills - - -	Brookline.
1887	Francis, Richard Pearce - -	Boston.
1888	Gallison, Ambrose John - -	Franklin.
1887	Gillespie, John - - - -	Roxbury.
1887	Gilman, Warren Randall - -	Boston.

1888	Gould, Clarke Storer - - -	Maynard.
1887	Greene, Edward Miller - -	Boston.
1887	Greene, Ray Woodville - -	Worcester.
1887	Harkins, Daniel Stanislaus - -	Boston.
1887	Hayes, Thomas Joseph - -	Beverly.
1888	Hoadley, Alfred Henry - -	Northampton.
1888	Howe, Elsie Brewster - - -	Boston.
1888	Hunting, Nathaniel Stevens -	Boston.
1888	Hurd, Kate Campbell - - -	Newburyport.
1888	Hurley, Daniel Bartholomew -	Arlington.
1887	Jack, Edwin Everett - - -	Boston.
1888	Jacobs, Henry Barton - -	Boston.
1887	Jones, Gilbert Norris - - -	Boston.
1887	Kelley, Michael Joseph - -	Watertown.
1888	Kennedy, Catherine Moloney -	Springfield.
1887	Libby, George Wesley Harding -	Worcester.
1888	Locke, Horace Mann - - -	Somerville.
1888	Lumbard, John Patrick - -	Dorchester.
1887	Lyon, Arthur Vinal - - -	Brockton.
1887	Macdonald, Colin William - -	Roxbury.
1887	Mahoney, John Bernard - -	Malden.
1888	Mansfield, Francis - - -	Taunton.
1887	Maynard-Bellerose, Joseph H -	Worcester.
1888	McNally, William Joseph - -	Charlestown.
1887	Morrison, William Alexander -	Boston.
1887	Morse, Frank Adelbert - -	Lynn.
1887	Nash, George William - -	Ottawa, Kan.
1887	Newton, Edward Cazneau - -	Provincetown.
1887	Noble, Alfred Ira - - -	Worcester.
1887	Norton, Eliza B Lawrence - -	Walpole.
1887	Nottage, Herbert Percy - -	Chelsea.
1887	O'Donnell, Francis Michael -	Newton.
1887	Palmer, Sarah Ellen - - -	Boston.
1888	Parsons, Ralph Alfred - -	West Roxbury.
1887	Patten, Julia Maria - - -	Holyoke.
1887	Paul, Walter Everard - - -	Boston.
1887	Peirce, Charles John - - -	Shirley Village.
1887	Phippen, Hardy - . - -	Salem.
1887	Sears, Henry Francis - - -	Boston.
1888	Sheedy, Daniel Michael - -	Northampton.
1887	Simons, Thomas Gaff - - -	Springfield.
1887	Smith, James Frederick - -	Westford.
1887	Soules, Silas George - - -	Hudson.
1887	Sprague, Phebe Ann - - -	Springfield.
1887	Stearns, Charles Goddard - -	Leicester.
1887	Stone, Arthur Kingsbury - -	Boston.

1887	Thorndike, Augustus - - -	Boston.
1887	Thorndike, Paul - - -	Boston.
1888	Trevino, Manuel Francisco -	Boston.
1887	Tuck, Lorenzo Wadsworth -	Boston.
1887	Tuttle, Albert Henry - - -	Cambridgeport.
1887	Walker, John Baldwin - -	Boston.
1888	Webster, George Arthur - -	Boston.
1887	Whittier, Francis Fremont - -	Brookline.
1887	Williams, Henry Clarence - -	Melrose.
1887	Woodbridge, Luther Dane - -	Williamstown.
1888	Worcester, Charles Pomeroy -	Boston.
1887	Zabriskie, Frank Hunter - -	Greenfield.

Total, 87.

List of Deceased Fellows.

Admitted.	Name.	Residence.	Date of Death.	Age.
1866	Allen, George Otis	West Roxbury	Oct. 3, 1887	48
1837	Atwood, George	Fairhaven	Jan. 16, 1888	72
1883	Bagg, John Sullivan	Springfield	July 9, 1887	38
1879	Bennett, Luther William	Boston	Jan. 4, 1888	37
1851	Clarke, Rowse Reynolds	Whitinsville	Feb. 4, 1888	65
1850	Cross, Enoch	Newburyport	May 17, 1888	86
1850	Dana, David	Lawrence	Dec. 10, 1887	64
1847	Drake, Ebenezer Wade	Middleboro'	June 28, 1887	69
1860	French, John Odoway	Hanover	Sept. 28, 1887	65
1875	Hackett, Charles Warren	Maplewood	June 30, 1887	35
1869	Heath, Charles Edmund	Lee	Oct. 5, 1887	56
1846	Jones, George Stevens	Boston	Feb. 2, 1888	70
1872	McArthur, John Ambrose	Lynn	Sept. 28, 1887	56
1875	McGowan, Charles Edward	South Boston	Nov. 12, 1887	36
1888	Mullen, Francis Henry	Dorchester	Mar. 15, 1888	31
1867	Nichols, James Robinson	Haverhill	Jan. 2, 1888	68
1840	Parker, David McCaire	Boston	Oct. 8, 1887	71
1861	*Parker, Peter	Washington, D.C.	Jan. 10, 1888	83
1866	Priest, George Arthur	Manchester	April 25, 1888	59
1853	Smith, John Manchester	Vineyard Haven	Dec. 15, 1887	61
1865	Smith, Norman	Groton	May 24, 1888	76
1846	Spalding, Joel	Lowell	Jan. 30, 1888	68
1857	Spring, Charles Harrison	Boston	Dec. 9, 1887	55
1847	Stickney, Pierre LeBreton	Springfield	Nov. 5, 1887	73
1887	Swallow, Edward Emerson	Waltham	Dec. 31, 1887	34
1854	Tanner, Nelson Briggs	North Abington	Nov. 25, 1887	70
1880	Totten, John Edmund	Attleboro'	Nov. 3, 1887	37
1855	Trow, Nathaniel Gilman	Sunderland	Feb. 4, 1888	76
1837	Ware, Charles Eliot	Boston	Sept. 3, 1887	73
1860	Warren, Charles	Wellesley Hills	Jan. 31, 1888	73
1878	Waterman, James Henry	Westfield	Nov. 23, 1887	51
1886	Wellington, Charles Berwick	Cambridgeport	Feb. 17, 1888	28
1838	Wilde, James	Duxbury	Oct. 15, 1887	74

* Honorary.

Total, 33.

The Treasurer, Dr. Draper, read his annual report.

The Society voted to concur with the Council in the repeal of the following sections of the concurrent vote of the Councillors and Society, October 7, 1874 (By-Laws, etc., pp. 27, 28):

That tickets or diplomas of Botanic, Eclectic, or Homœopathic colleges, or of colleges devoted to any peculiar or exclusive system of medicine, are considered irregular, and will not be recognized under any circumstances;

And, That certificates from teachers who practise any peculiar or exclusive system of medicine, who advertise, or who violate in any way the code of ethics adopted by the profession in this State, will not be taken, even though the teacher himself be a regular graduate in medicine.

Voted,—That a committee of one be appointed by the chair to coöperate with Prof. Shaler and Gen. Greely in studying the distribution of disease throughout the State of Massachusetts.

The chair appointed Dr. W. Everett Smith, of Boston, to act as this Committee.

The Committee appointed at the last annual meeting of the Society to investigate the subject of Physical Culture in Schools reported through Dr. Withington.

It was voted that the report of the Committee be presented to the State Board of Education, with the endorsement of the Society.

The following papers were read:

7. Postural Treatment of Constipation.—By Edward T. Williams, M.D., of Roxbury.

8. The Surgical Treatment of Malignant Growths.—By Maurice H. Richardson, M.D., of Boston. Dr. Beach made remarks upon this paper.

9. The Value of Corrosive Sublimate as a Practical Disinfectant.—By William B. Hills, M.D., of Cambridge. Dr. Durgin spoke on this paper.

The following delegates from other Societies were present at the meetings:

Maine.—Dr. W. O. Stone.
New Hampshire.—Dr. C. T. Bancroft.
Vermont.—Dr. J. B. Wheeler.
Conn. Valley.—Dr. O. W. Phelps.
Rhode Island.—Drs. W. L. Monro, A. Potter.
New York.—Dr. H. M. Fenno.
Pennsylvania.—Dr. F. Woodbury.

Drs. Potter and Woodbury were introduced, and presented the greetings of their respective Societies.

At 12 o'clock the Annual Discourse was delivered by Dr. B. JOY JEFFRIES, of Boston.

At the close of the oration a vote of thanks was presented to the orator for his admirable address.

The President introduced the President-elect, Dr. DAVID W. CHEEVER, of Boston.

At 1, P.M., the Society adjourned to the Hotel Vendome, where a reception and banquet were held; more than eight hundred Fellows and invited guests being present.

FRANCIS W. GOSS,
Recording Secretary.

TREASURER'S REPORT.

The Treasurer respectfully submits the following statement of the Society's finances for the year ending April 15, 1888:

Balance from last account . . .	$2315 21
Receipts from all other sources during year	8999 65
	$11314 86
Expenses	8799 15
Balance to new account	$2515 71

The receipts and disbursements appear in detail on the following pages.

The Society's invested funds amount to $33,420.17, distributed thus:

Shattuck Fund	. .	$9,166 87
General Fund	. . .	11,253 30
Phillips Fund	. . .	10,000 00
Cotting Fund	. . .	3,000 00

These funds yielded an income of $1,291.79.

Assessment-dues to the amount of one hundred and ninety dollars have been remitted during the year, by vote of the Councillors, upon the recommendation of the Committee on Membership and Finances.

Twelve members of the Society have lost their membership by removal from Massachusetts and neglect to pay their assessments.

The names of two Fellows have been dropped from the rolls, with the approval of the Council, in accordance with the By-Laws, for five years' delinquency in the payment of assessment-dues.

Sixteen members have resigned their membership, and four have been re-instated, by vote of the Council.

The Society numbers 1685 Fellows.

F. W. DRAPER,
Treasurer.

BOSTON, JUNE 5, 1888.

The Committee appointed at the February meeting to audit the Treasurer's accounts, have carefully attended to their duty, and respectfully report that they find the accounts properly vouched and correctly cast.

The balance on hand is $2,515.71.

The invested funds correspond with the schedule exhibited, and amoun to $33,420.17.

ALBERT WOOD, } *Auditing*
SAM'L J. MIXTER, } *Committee.*

BOSTON, April 27, 1888.

Dr. F. W. Draper, Treasurer, in account with

Receipts.

Balance from last account			**$2315 21**
Assessments paid to the Treasurer			**1960 00**
Assessments collected by District Treasurers:—			
	Barnstable	**$105 00**	
	Berkshire	**160 00**	
	Bristol North	**140 00**	
	Bristol South	**210 00**	
	Essex North	**310 00**	
	Essex South	**365 00**	
	Franklin	**115 00**	
	Hampden	**335 00**	
	Hampshire	**165 00**	
	Middlesex East	**100 00**	
	Middlesex North	**405 00**	
	Middlesex South	**280 00**	
	Norfolk	**585 00**	
	Norfolk South	**115 00**	
	Plymouth	**125 00**	
	Suffolk	**1400 00**	
	Worcester	**570 00**	
	Worcester North	**160 00**	
			5645 00
Interest account:—			
	General Fund	**450 12**	
	Phillips Fund	**400 00**	
	Shattuck Fund	**366 67**	
	Cotting Fund	**75 00**	
	Interest on cash-balance in Savings Banks	**87 86**	
			1379 65
Diploma			**5 00**
Extra Dinner Tickets sold June 8, 1887			**10 00**
			$11,314 86

the Massachusetts Medical Society. Cr.

PAYMENTS.

On account of Annual Meeting, 1887:—		
Caterer's bill	$1613 80	
Cigars	72 00	
Exhibit expenses	51 63	
Incidentals	81 68	
Music	104 00	
Printing	17 63	
Rent of Dining Hall	150 00	
		$2090 74
Committee on Publications:—		
Braithwaite's Retrospect	2447 50	
Triennial Catalogue	352 48	
Communications and Transactions, 1887	608 10	
Wood Cuts for Medical Communications	25 00	
		3433 08
Councillors' Orders:—		
Lunches at Stated Meetings (Cotting Fund)	50 00	
Printing new edition of By-Laws	53 73	
		103 73
District Societies' Account:—		
Censors-at-large, for advertising meetings, printing and postage	28 50	
Censors' fees for examining candidates for Fellowship	372 00	
Dividend, 1887	1000 00	
District Treasurers' collection fees and expenses	314 20	
		1714 70
Librarian's Expenses:—		
Allowance for Clerk	50 00	
Incidentals (wrapping paper, etc.)	26 10	
Postage and express charges	413 25	
		489 35
Recording Secretary's Expenses:—		
Postage and printing	70 25	
Incidentals	1 40	
Salary	250 00	
		321 65
Rent to January 1, 1888		150 00
Treasurer's Expenses:—		
Incidentals	2 50	
Postage and printing	88 75	
Salary	400 00	
Stationery	4 65	
		495 90
		8799 15
Balance to new account, April 15, 1888		2515 71
		$11,314 86

Officers of the Massachusetts Medical Society.

1888—1889.

Chosen June 12, 1888.

DAVID W. CHEEVER,	. Boston, . .	President.
GEORGE JEWETT, .	. Fitchburg, .	Vice-President.
FRANK W. DRAPER,	. Boston, . .	Treasurer.
CHARLES W. SWAN,	. Boston, . .	Cor. Secretary.
FRANCIS W. GOSS, .	. Roxbury, .	Rec. Secretary.
EDWIN H. BRIGHAM,	. Boston, . .	Librarian.
HENRY P. WALCOTT,	. Cambridge, .	Orator.
JAMES R. CHADWICK,	Boston, . .	Anniv. Chairman.

Standing Committees.

Of Arrangements.

H. C. Ernst, V. Y. Bowditch, H. L. Burrell,
O. K. Newell, F. B. Harrington, R. W. Lovett.

On Publications.

G. C. Shattuck, R. M. Hodges, B. E. Cotting.

On Membership and Finances.

F. Minot, B. S. Shaw, J. Stedman,
E. G. Cutler, L. R. Stone.

To Procure Scientific Papers.

H. P. Walcott, E. H. Bradford, C. M. Green,
C. W. Cooper, S. B. Woodward, L. Wheeler.

On Ethics and Discipline.

G. J. Townsend, G. E. Francis, A. H. Johnson,
C. Howe, F. C. Shattuck.

On Medical Diplomas.

W. L. Richardson, A. H. Cowdrey, E. J. Forster.

Presidents of District Societies—Vice-Presidents (Ex-Officiis).

(Arranged according to Seniority.)

N. B. Edwards,	C. D. Prescott,
C. M. Hulbert,	J. M. Blood,
L. R. Stone,	W. M. Mercer,
J. M. Rice,	C. G. Carleton,
J. Homans,	O. B. Shreve,
J. Stedman,	S. W. Kelley,
S. D. Presbrey,	C. W. Cooper,
T. F. Breck,	W. M. Wright,
J. B. Brewster,	J. H. Robbins.

Councillors.

Barnstable.—Drs. G. W. Doane, Hyannis; G. N. Munsell, Harwich; S. Pitcher, Hyannis.

Berkshire.—Drs. H. Colt, Pittsfield; H. M. Holmes, Adams; J. H. A. Matte, North Adams; W. P. Small, Great Barrington; A. M. Smith, Williamstown; A. T. Wakefield, Sheffield.

Bristol North.—Drs. J. P. Brown, A. S. Deane, E. F. Galligan, F. A. Hubbard, Taunton; G. Mackie, Attleboro'.

Bristol South.—Drs. E. P. Abbé, New Bedford; S. W. Bowen, Fall River; G. L. Ellis, Middleboro'; S. W. Hayes, New Bedford; J. H. Jackson, Fall River; W. H. Taylor, J. J. B. Vermyne, New Bedford.

Essex North.—Drs. J. Crowell, Haverhill; C. N. Chamberlain, Lawrence; J. A. Douglass, Amesbury; F. A. Howe, G. Montgomery, Newburyport; C. P. Morrill, North Andover; R. B. Root, Georgetown; O. Warren, West Newbury; L. J. Young, Haverhill.

Essex South.—Drs. J. Allen, Topsfield; C. A. Carlton, Salem; P. Eveleth, Marblehead; I. F. Galloupe, Lynn; J. E. Garland, Gloucester; J. W. Goodell, Lynn; F. E. Hines, Salem; E. A. Kemp, Danvers; G. S. Osborne, Peabody; G. B. Stevens, Gloucester; W. E. Tucker, Ipswich; A. M. Tupper, Rockport.

Franklin.—Drs. F. J. Canedy, Sherburne Falls; A. E. Deane, Greenfield; G. R. Fessenden, Ashfield.

HAMPDEN.—Drs. G. Dresser, Chicopee; J. T. Herrick, Springfield; F. Holyoke, Holyoke; G. C. McClean, V. L. Owen, A. R. Rice, Springfield; A. O. Squire, Indian Orchard; W. J. Tracy, Westfield.

HAMPSHIRE.—Drs. C. M. Barton, Hatfield; C. B. King, Belchertown; W. M. Trow, Northampton; F. Tuckerman, Amherst; C. S. Wheeler, Williamsburg.

MIDDLESEX EAST.—Drs. J. P. Bixby, North Woburn; A. H. Cowdrey, Stoneham; C. C. Odlin, Melrose; W. F. Stevens, Stoneham.

MIDDLESEX NORTH.—Drs. W. Bass, Lowell; C. Dutton, Tyngsboro'; N. B. Edwards, North Chelmsford; C. M. Fisk, J. H. Gilman, Lowell; W. F. Heald, Pepperell; J. C. Irish, W. H. Lathrop, A. W. Lavigne, F. Nickerson, Lowell.

MIDDLESEX SOUTH.—Drs. Z. B. Adams, Framingham; C. H. Cook, Natick; T. Crozier, Charlestown; E. R. Cutler, Waltham; W. W. Dow, Somerville; S. W. Driver, Cambridge; H. M. Field, Newton; E. J. Forster, Charlestown; J. L. Hildreth, Cambridge; R. L. Hodgdon, Arlington; H. Holmes, Lexington; A. F. Holt, Cambridgeport; A. Hosmer, Watertown; A. C. Livermore, Stow; G. C. Pierce, Ashland; E. H. Stevens, North Cambridge; J. L. Sullivan, Malden; J. B. Taylor, East Cambridge; G. J. Townsend, South Natick; H. P. Walcott, Cambridge; A. C. Webber, W. W. Wellington, Cambridgeport; J. W. Willis, Waltham; M. Wyman, Cambridge.

NORFOLK.—Drs. C. A. Bemis, West Medway; N. Call, Roxbury; J. W. Chase, Dedham; G. W. Clement, Roxbury; B. Cushing, Dorchester; E. F. Dunbar, Roxbury; H. C. Ernst, Jamaica Plain; W. S. Everett, Hyde Park; E. L. Farr, Roxbury; W. C. B. Fifield, Dorchester; D. S. Fogg, Norwood; E. P. Gerry, Jamaica Plain; H. P. Jaques, Milton; A. D. Kingsbury, Needham; G. K. Sabine, Brookline; H. R. Stedman, Roslindale; G. D. Townshend, C. F. Withington, Roxbury.

NORFOLK SOUTH.—Drs. J. A. Gordon, Quincy; F. C. Granger, Randolph; J. W. Spooner, Hingham.

PLYMOUTH —Drs. J. H. Averill, Campello; H. F. Borden, Brockton; J. C. Gleason, Rockland; B. F. Hastings, Whitman; A. Millet, East Bridgewater; A. E. Paine, Brockton.

SUFFOLK.—Drs. S. L. Abbot, J. Ayer, H. J. Barnes, H. J. Bigelow, C. J. Blake, H. I. Bowditch, E. H. Bradford, F. E. Bundy, J. S. F. Bush, A. T. Cabot, J. R. Chadwick, D. W. Cheever, *President*, J. W. Cushing, O. W. Doe, F. W. Draper, *Treasurer*, S. H. Durgin, T. Dwight, Boston; T. W. Fisher, South Boston; R. H. Fitz, C. F. Folsom, Boston; M. F. Gavin, South Boston; J. O. Green, F. B. Greenough, W. H. H. Hastings, W. C. Holyoke, J. Homans, W. Ingalls, B. J. Jeffries, G. F. Jelly, F. I. Knight, G. H. Lyman, A. E. McDonald, F. Minot, C. B. Porter, A. Post, J. P. Reynolds, W. L. Richardson, T. M. Rotch, G. B. Shattuck, G. C. Shattuck, B. S. Shaw, A. D. Sinclair, A. M. Sumner, C. W. Swan, *Corresponding Secretary*, G. G. Tarbell, O. F. Wadsworth, J. C. Warren, Boston; A. P. Weeks, Chelsea; J. C. White, E. N. Whittier, E. Wigglesworth, H. W. Williams, Boston.

WORCESTER.—Drs. A. D. Blodgett, West Brookfield; W. Davis, G. E. Francis, T. H. Gage, Worcester; E. B. Harvey, Westboro'; W. H. Lincoln, Millbury; J. O. Marble, Worcester; G. M. Morse, Clinton; J. G. Park, J. M. Rice, Worcester; W. E. Rice, North Grafton; G. C. Webber, Millbury; E. Warner, L. Wheeler, A. Wood, Worcester.

WORCESTER NORTH.—Drs. R. F. Andrews, Gardner; G. D. Colony, Fitchburg; J. R. Greenleaf, Gardner; B. H. Hartwell, Ayer; G. Jewett, *Vice-President*, Fitchburg.

Censors.

BARNSTABLE.—Drs. B. D. Gifford, Chatham; E. E. Hawes, Harwich; G. W. Kelley, Barnstable; E. C. Newton, Provincetown; J. E. Pratt, Sandwich.

BERKSHIRE.—Drs. J. F. A. Adams, C. M. Frye, F. K. Paddock, Pittsfield; F. P. Whittlesey, Great Barrington; L. D. Woodbridge, Williamstown.

Bristol North.—Drs. C. A. Atwood, O. Copp, Taunton; J. B. Gerould, North Attleboro'; J. B. Murphy, M. Perry, Taunton.

Bristol South.—Drs. A. J. Abbé, Fall River; C. A. Gould, Central Village; G. DeN. Hough, New Bedford; W. T. Learned, Fall River; F. M. Sherman, New Bedford.

Essex North.—Drs H. F. Adams, Newburyport; J. F. Croston, Haverhill; R. C. Huse, Georgetown; F. W. Kennedy, Lawrence; J. F. Young, Newburyport.

Essex South.—Drs. F. S. Atwood, Salem; W. W. Eaton, Danvers; H. K. Foster, Peabody; C. W. Haddock, Beverly; J. Kittredge, Marblehead.

Franklin.—Drs. E. G. Best, Turner's Falls; F. J. Canedy, F. H. Drew, Shelburne Falls; J. B. Laidley, Conway; A. C. Walker, Greenfield.

Hampden.—Drs. W. H. Chapin, F. W. Ellis, Springfield; L. J. Gibbs, Chicopee Falls; C. P. Hooker, S. F. Pomeroy, Springfield.

Hampshire.—Drs. J. M. Fay, Northampton; D. B. N. Fish, Amherst; I. C. Hill, Haydenville; H. H. Seelye, Amherst; G. D. Thayer, Northampton.

Middlesex East.—Drs. W. S. Brown, Stoneham; E. S. Jack, Melrose; D. March, Jr., Winchester; G. W. Nickerson, Stoneham; F. Winsor, Winchester.

Middlesex North.—Drs. H. P. Jefferson, H. S. Johnson, J. J. McCarty, G. E. Pinkham, C. P. Spalding, Lowell.

Middlesex South.—Drs. W. A. Bell, Somerville, E. Farnham, Cambridge; H. E. Marion, Brighton; F. W. Taylor, North Cambridge; A. Worcester, Waltham.

Norfolk.—Drs. H. W. Broughton, Jamaica Plain; S. M. Crawford, Roxbury; J. A. Tanner, Dorchester; F. W. Vogel, H. W. White, Roxbury.

Norfolk South.—Drs. S. M. Donovan, Quincy; J. C. Fraser, East Weymouth; C. E. Prior, Holbrook; G. W. Tinkham, Weymouth; C. C. Tower, South Weymouth.

PLYMOUTH.—Drs. E. A. Chase, W. P. Chisholm, W. C. Keith, F. J. Ripley, Brockton; F. G. Wheatley, North Abington.

SUFFOLK.—Drs. H. L. Burrell, E. G. Cutler, G. M. Garland, C. M. Green, J. H. McCollom, Boston.

WORCESTER.—Drs. W. P. Bowers, Clinton; O. H. Everett, H. S. Knight, C. A. Peabody, Worcester; G. C. Webber, Millbury.

WORCESTER NORTH.—Drs. C. H. Bailey, South Gardner; C. E. Bigelow, E. J. Cutter, Leominster; H. H. Lyons, F. H. Thompson, Fitchburg.

Commissioners of Trials.

BARNSTABLE	D. R. Ginn	Dennisport.
BERKSHIRE	A. M. Smith	Pittsfield.
BRISTOL NORTH	J. P. Brown	Taunton.
BRISTOL SOUTH	J. Dwelly	Fall River.
ESSEX NORTH	F. A. Howe	Newburyport.
ESSEX SOUTH	A. H. Johnson	Salem.
FRANKLIN	C. Bowker	Bernardston.
HAMPDEN	E. G. Ufford	Agawam.
HAMPSHIRE	J. Yale	Ware.
MIDDLESEX EAST	S. W. Abbott	Wakefield.
MIDDLESEX NORTH	W. M. Hoar	Lowell.
MIDDLESEX SOUTH	G. C. Pierce	Ashland.
NORFOLK	C. C. Hayes	Hyde Park.
NORFOLK SOUTH	C. E. Prior	Holbrook.
PLYMOUTH	H. N. Jones	Kingston.
SUFFOLK	C. W. Swan	Boston.
WORCESTER	J. H. Robinson	Southboro'.
WORCESTER NORTH	A. L. Stickney	Ashburnham.

Officers of the District Medical Societies.

BARNSTABLE.—Dr. C. M. Hulbert, South Dennis, *President*; Dr. S. T. Davis, Orleans, *Vice-President*; Dr. F. A. Rogers, Brewster, *Secretary*; Dr. C. M. Hulbert, South Dennis, *Treasurer*.

Berkshire.—Dr. W. M. Mercer, Pittsfield, *President;* Dr. C. W. Burton, Adams, *Vice-President;* Dr. H. Colt, Pittsfield, *Secretary;* Dr. W. W. Leavitt, Pittsfield, *Treasurer;* Dr. W. L. Paddock, Pittsfield, *Librarian.*

Bristol North.—Dr. S. D. Presbrey, Taunton, *President;* Dr. W. S. Robinson, Taunton, *Vice-President;* Dr. F. Mansfield, Taunton, *Secretary;* Dr. P. W. Hewins, Taunton, *Treasurer;* Dr. S. F. Haskins, Taunton, *Librarian.*

Bristol South.—Dr. C. D. Prescott, New Bedford, *President;* Dr. G. S. Eddy, Fall River, *Vice-President;* Dr. W. H. Taylor, New Bedford, *Secretary, Treasurer and Librarian.*

Essex North.—Dr. C. G. Carleton, Lawrence, *President;* Dr. G. W. Snow, Newburyport, *Vice-President;* Dr. M. D. Clarke, Haverhill, *Secretary and Treasurer.*

Essex South.—Dr. O. B. Shreve, Salem, *President;* Dr. J. Allen, Topsfield, *Vice-President;* Dr. H. W. Newhall, Lynn, *Secretary;* Dr. W. Neilson, Salem, *Treasurer;* Dr. B. R. Symonds, Salem, *Librarian.*

Franklin.—Dr. W. M. Wright, Orange, *President;* Dr. C. G. Trow, Sunderland, *Vice-President;* Dr. F. H. Zabriskie, Greenfield, *Secretary and Treasurer.*

Hampden.—Dr. T. F. Breck, Springfield, *President;* Dr. J. J. O'Connor, Holyoke, *Vice-President;* Dr. G. L. Woods, Springfield, *Secretary, Treasurer and Librarian.*

Hampshire.—Dr. C. W. Cooper, Northampton, *President;* Dr. W. Dwight, North Amherst, *Vice-President;* Dr. B. D. Sheedy, Northampton, *Secretary;* Dr. J. Dunlap, Northampton, *Treasurer;* Dr. G. D. Thayer, Northampton, *Librarian.*

Middlesex East.—Dr. S. W. Kelley, Woburn, *President;* Dr. F. W. Graves, Woburn, *Vice-President;* Dr. D. March, Jr., Winchester, *Secretary;* Dr. J. O. Dow, Reading, *Treasurer.*

Middlesex North.—Dr. N. B. Edwards, North Chelmsford, *President;* Dr. H. J. Smith, Lowell, *Vice-President;* Dr. W. G. Eaton, Jr., Lowell, *Secretary;* Dr. W. B. Jackson, Lowell, *Treasurer;* Dr. C. A. Viles, Lowell, *Librarian.*

MIDDLESEX SOUTH.—Dr. L. R. Stone, Newton, *President;* J. T. G. Nichols, Cambridge, *Vice-President;* Dr. J. A. Mead, Watertown, *Secretary;* Dr. W. Ela, Cambridge, *Treasurer;* Dr. W. A. Winn, Arlington, *Librarian.*

NORFOLK.—Dr. J. Stedman, Jamaica Plain, *President;* Dr. J. Seaverns, Roxbury, *Vice-President;* Dr. S. A. Potter, Roxbury, *Secretary and Librarian;* Dr. E. G. Morse, Roxbury, *Treasurer.*

NORFOLK SOUTH.—Dr. J. H. Robbins, Hingham, *President;* Dr. C. A. Dorr, South Hingham, *Vice-President;* Dr. J. F. Welch, Quincy, *Secretary and Treasurer;* Dr. S. C. Bridgham, South Braintree, *Librarian.*

PLYMOUTH.—Dr. J. B. Brewster, Plymouth, *President;* Dr. A. E. Paine, Brockton, *Vice-President;* Dr. A. V. Lyon, Brockton, *Secretary and Treasurer;* Dr. A. A. MacKeen, Whitman, *Librarian.*

SUFFOLK.—Dr. J. Homans, Boston, *President;* Dr. G. W. Gay, Boston, *Vice-President;* Dr. H. F. Vickery, Boston, *Secretary;* Dr. E. M. Buckingham, Boston, *Treasurer;* Dr. B. J. Jeffries, Boston, *Librarian.*

WORCESTER.—Dr. J. M. Rice, Worcester, *President;* Dr. G. Brown, Barre, *Vice-President;* Dr. W. C. Stevens, Worcester, *Secretary;* Dr. S. B. Woodward, Worcester, *Treasurer;* Dr. A. C. Getchell, Worcester, *Librarian.*

WORCESTER NORTH.—Dr. J. M. Blood, Ashby, *President;* Dr. B. H. Hartwell, Ayer, *Vice-President;* Dr. A. P. Mason, Fitchburg, *Secretary;* Dr. E. P. Miller, Fitchburg, *Treasurer;* Dr. F. H. Thompson, Fitchburg, *Librarian.*

Massachusetts Medical Society.

PROCEEDINGS OF THE COUNCILLORS.

October 3, 1888.

A Stated Meeting of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Wednesday, October 3, 1888, at 11 o'clock, A.M.

The President, Dr. David W. Cheever, in the chair.

The following Councillors were present:

Bristol North.
F. A. Hubbard.

Bristol South.
S. W. Bowen,
G. L. Ellis,
W. H. Taylor.

Essex North.
J. Crowell,
J. A. Douglass,
F. A. Howe,
G. Montgomery,
R. B. Root.

Essex South.
J. Allen,
J. W. Goodell,
G. S. Osborne,
G. B. Stevens,
W. E. Tucker,
A. M. Tupper.

Middlesex East.
J. P. Bixby,
A. H. Cowdrey,
W. F. Stevens.

Middlesex North.
C. Dutton,
W. H. Lathrop,
F. Nickerson.

Middlesex South.
Z. B. Adams,
C. H. Cook,
W. W. Dow,
E. J. Forster,
R. L. Hodgdon,
H. Holmes,
A. Hosmer,
G. C. Pierce,
J. B. Taylor,
H. P. Walcott,
A. C. Webber,
W. W. Wellington,
J. W. Willis,
M. Wyman.

Norfolk.
N. Call,
E. F. Dunbar,
H. C. Ernst,
W. S. Everett,
D. S. Fogg,
H. R. Stedman.

Norfolk South.
J. A. Gordon.

Plymouth.
J. H. Averill,
H. F. Borden,
J. C. Gleason,
B. F. Hastings,
A. Millet.

Suffolk.
S. L. Abbot,
F. E. Bundy,
D. W. Cheever,
J. W. Cushing,
F. W. Draper,
R. H. Fitz,
W. H. H. Hastings,
W. C. Holyoke,
J. Homans,
W. Ingalls,
B. J. Jeffries,
F. I. Knight,

F. Minot,	A. P. Weeks,	J. O. Marble,
A. Post,	E. N. Whittier,	G. M. Morse.
W. L. Richardson,	H. W. Williams.	
T. M. Rotch,		*Worcester North.*
G. C. Shattuck,	*Worcester.*	B. H. Hartwell,
A. D. Sinclair,	A. G. Blodgett,	G. Jewett.
C. W. Swan,	G. E. Francis,	
J. C. Warren,	W. H. Lincoln,	Total, 77.

The record of the previous meeting was read and accepted.

The following were appointed Delegates to other State Medical Societies:

Vermont.—Drs. F. H. Brown, of Boston; F. H. Thompson, of Fitchburg.

New York.—Drs. W. Ingalls, of Boston; F. W. Chapin, of Springfield.

New York State Medical Association.—Drs. E. B. Harvey, of Westboro'; J. F. A. Adams, of Pittsfield.

The Committee on Membership and Finances reported through Dr. Minot. In accordance with their recommendation the following was allowed to resign:

Charles Schram, of New York, N. Y.

Also the following were placed on the retired list:

Henry C. Chapin, of Lincoln.
Alfred C. Garratt, of Boston.
Edwin A. W. Harlow, of Quincy.
Gilman Kimball, of Lowell.
Alexander S. McClean, of Springfield.
Daniel D. Slade, of Chestnut Hill.
Robert White, of Boston.
James O. Whitney, of Pawtucket, R. I.

Voted,—That Henry Austin Wood, of Waltham, be restored to membership in the Society.

Dr. Walcott presented the following resolutions, which were adopted:

That in the opinion of the Councillors of the Massachusetts Medical Society the present epidemic of Yellow Fever, in several

States of this Union, has again made evident the imperative need of some organization on the part of the general government for the protection of the public health;—an organization that shall be independent of existing bureaus, and solely devoted to this most necessary function of any form of government.

That this resolution be sent to the President of the United States, to Members of Congress, and to the Boards of Health of the several States.

Adjourned at 11.30, A.M.

FRANCIS W. GOSS,
Recording Secretary.

FEBRUARY 6, 1889.

A STATED MEETING of the Councillors was held in the hall of the Medical Library Association, No. 19 Boylston Place, Boston, on Wednesday, February 6, 1889, at 11 o'clock, A.M.

The President, Dr. DAVID W. CHEEVER, in the chair.

The following Councillors were present:

Barnstable.
S. Pitcher.

Bristol North.
F. A. Hubbard.

Bristol South.
S. W. Bowen,
G. L. Ellis,
J. H. Jackson,
W. H. Taylor.

Essex North.
J. Crowell,
C. P. Morrill,
R. B. Root.

Essex South.
J. Allen,
C. A. Carlton,
J. W. Goodell,
E. A. Kemp.

Hampshire.
F. Tuckerman.

Middlesex East.
J. P. Bixby,
A. H. Cowdrey.

Middlesex North.
N. B. Edwards,
J. H. Gilman,
J. C. Irish,
F. Nickerson.

Middlesex South.
Z. B. Adams,
T. Crozier,
S. W. Driver,
E. J. Forster,
R. L. Hodgdon,
H. Holmes,
J. B. Taylor,
G. J. Townsend,
H. P. Walcott,
A. C. Webber,
J. W. Willis.

Norfolk.
E. F. Dunbar,
H. C. Ernst,
W. S. Everett,
A. D. Kingsbury,
H. R. Stedman,
C. F. Withington.

Norfolk South.
J. W. Spooner.

Plymouth.
H. F. Borden,
J. C. Gleason,
A. Millet,
A. E. Paine.

Suffolk.
S. L. Abbot,

H. J. Barnes,
C. J. Blake,
H. I. Bowditch,
J. F. S. Bush,
A. T. Cabot,
J. R. Chadwick,
D. W. Cheever,
J. W. Cushing,
F. W. Draper,
T. W. Fisher,
R. H. Fitz,
M. F. Gavin,
J. O. Green,
W. H. H. Hastings,
W. C. Holyoke,
B. J. Jeffries,
F. I. Knight,
G. H. Lyman,
F. Minot,
C. B. Porter,
W. L. Richardson,
T. M. Rotch,
G. B. Shattuck,
G. C. Shattuck,
B. S. Shaw,
A. M. Sumner,
C. W. Swan,
J. C. Warren,
A. P. Weeks,
E. Wigglesworth,
H. W. Williams.

Worcester.
G. E. Francis,
T. H. Gage,
E. B. Harvey,
W. E. Rice,
G. C. Webber.

Worcester North.
R. F. Andrews,
B. H. Hartwell,
G. Jewett.

Total, 82.

The record of the last meeting was read and accepted.

The following were appointed Delegates to other State Medical Societies:

Maine: Drs. A. Millet, of East Bridgewater; E. D. Hill, of Plymouth.

New Hampshire: Drs. M. D. Clarke, of Haverhill; C. W. Spring, of Fitchburg.

Rhode Island: Drs. O. S. Lovejoy, of Haverhill; J. R. Bronson, of Attleboro'.

Connecticut: Drs. G. H. Lyman, of Boston; I. R. Sanford, of Sheffield.

New Jersey: Drs. H. W. Williams, of Boston; W. M. Trow, of Northampton.

The following Committees were appointed:

To Audit the Treasurer's Accounts.—Drs. S. J. Mixter, J. S. Greene.

To Examine the By-Laws of District Societies.—Drs. S. D. Presbrey, J. C. White, F. W. Chapin.

The Committee on Membership and Finances reported through Dr. Minot. In accordance with their recommendation the following were allowed to resign:

Francis F. Dole, of Los Angeles, Cal.
Horatio R. Storer, of Newport, R. I.
Arthur A. Sweeney, of Saint Paul, Minn.

Also the following were allowed to retire:

Isaac F. Galloupe, of Lynn.
Barron C. Watson, of Centre Marshfield.

Also the following was dropped from the roll for non-payment of dues:

George D. Rogers, of Byfield.

Also the following, having forfeited membership by removal from the State and non-payment of dues, were dropped from the roll:

Azel Ames, Jr., of Chicago, Ill.
Frederick F. Bigelow, of Patten, Me.
Walter M. Friend, of London, Eng.
James E. Kelly, of New York, N. Y.
Edward A. McGannon, of Brockville, Can.
Hayward Stetson, of Homosassa, Fla.
William S. Woodworth, of Upper Canard, N. S.

Voted,—That Guy Hubbard Gardner, of Winchester, be restored to membership in the Society.

A communication from the Committee of Revision of the U. S. Pharmacopœia was read, requesting the Society to take action regarding the system of weights and measures to be used in constructing the working formulas of the Pharmacopœia.

Voted,—That the matter be referred to Drs. B. F. Davenport, F. H. Williams and Charles Harrington, as a Committee, with full powers to act for the Society, and that they also be appointed Delegates from the Society to the Pharmacopœial Convention in 1890.

Adjourned at 11.40, A.M.

FRANCIS W. GOSS,
Recording Secretary.

JUNE 11, 1889.

THE ANNUAL MEETING of the Councillors was held in the hall of the Medical Library Association, No. 19

Boylston Place, Boston, on Tuesday, June 11, 1889, at 7 o'clock, P.M.

The President, Dr. DAVID W. CHEEVER, in the chair.

The following Councillors were present:

Barnstable.
A. H. Newton.

Berkshire.
G. S. Hatch,
G. H. Race.

Bristol North.
E. F. Galligan,
F. A. Hubbard,
S. D. Presbrey.

Bristol South.
S. W. Bowen,
D. E. Cone,
J. H. Jackson.

Essex North.
C. N. Chamberlain,
F. A. Howe,
L. J. Young.

Essex South.
H. Colman,
I. F. Galloupe,
F. E. Hines,
G. S. Osborne,
C. C. Pike,
C. C. Sheldon.

Hampden.
G. W. Davis,
J. W. Hannum,
E. E. Maryott.

Middlesex East.
F. F. Brown,
A. H. Cowdrey,
J. M. Harlow.

Middlesex North.
F. W. Chadbourne,
J. J. Colton,
C. I. Fisher,
J. H. Gilman,
W. F. Heald.

Middlesex South.
Z. B. Adams,
C. H. Cook,
T. Crozier,
S. W. Driver,
D. M. Edgerly,
R. L. Hodgdon,
H. Holmes,
A. Nott,
G. A. Oviatt,
G. C. Pierce,
F. E. Porter,
G. J. Townsend,
C. E. Vaughan,
A. C. Webber,
W. W. Wellington,
J. W. Willis,
M. Wyman.

Norfolk.
H. W. Broughton,
J. W. Chase,
G. W. Clement,
B. E. Cotting,
B. Cushing,
E. F. Dunbar,
W. S. Everett,
W. C. B. Fifield,
D. S. Fogg,
E. P. Gerry,
A. D. Kingsbury,
G. K. Sabine,
H. R. Stedman,
C. F. Withington.

Norfolk South.
J. C. Fraser,
G. W. Tinkham.

Plymouth.
H. F. Borden,
H. W. Dudley,
B. F. Hastings.

Suffolk.
S. L. Abbot,
C. J. Blake,
H. I. Bowditch,
J. F. Bush,
A. T. Cabot,
D. W. Cheever,
J. W. Cushing,
F. W. Draper,
T. Dwight,
T. W. Fisher,
R. H. Fitz,
C. F. Folsom,
M. F. Gavin,
F. B. Greenough,
W. H. H. Hastings,
W. C. Holyoke,
J. Homans,
G. F. Jelly,
F. I. Knight,
A. E. McDonald,
F. Minot,
C. B. Porter,
A. Post,
J. P. Reynolds,
W. L. Richardson,
T. M. Rotch,

G. B. Shattuck,	E. Wigglesworth,	L. Wheeler,
A. D. Sinclair,	H. W. Williams.	A. Wood.
A. M. Sumner,		
G. G. Tarbell,	*Worcester.*	*Worcester North.*
O. F. Wadsworth,	G. Brown,	R. F. Andrews,
J. C. Warren,	W. Davis,	J. R. Greenleaf,
A. P. Weeks,	T. H. Gage,	G. Jewett,
J. C. White,	E. B. Harvey,	J. P. Lynde.
E. N. Whittier,	W. E. Rice,	Total, 113.

The record of the previous meeting was read and accepted.

The Secretary read the names of new and of deceased Fellows.

The Treasurer, Dr. Draper, read his annual report.

The Auditing Committee reported that they found the accounts properly vouched and correctly cast, and that the Society's invested funds corresponded with the schedule exhibited.

The Treasurer's report was then accepted.

The Committee on Membership and Finances reported through Dr. Minot and recommended that two fifths of the surplus in the treasury, amounting to $1320.68, be distributed among the District Societies.

The recommendation of the Committee was adopted.

On recommendation by the same Committee it was voted that the following be allowed to resign:

W. A. Gorton, of Providence, R. I.
J. B. Hyland, of Keene, N. H.
Louis Miller, of Stockbridge.
G. E. Putney, of Royalton, Minn.
W. H. Sherman, of Berlin, Neb.
H. F. M. Smith, of Ballston, N. Y.
C. G. Weston, of Minneapolis, Minn.
D. M. Wilcox, of Falls Village, Conn.

Also that the following be placed on the retired list:

W. M. Barrett, of Somerville.
M. F. Bridgman, of Brighton.

T. L. Cushman, of Randolph.
F. F. Forsaith, of Weymouth.
George King, of Franklin.
O. S. Lovejoy, of Haverhill.
J. B. Lyman, of Salem.
John Skinner, of Roxbury.

The Committee on By-Laws of the District Societies presented their report.

The Librarian, Dr. Brigham, made his annual report.

The Committee on Nominations reported a list of candidates for the offices of the Society for the ensuing year, and the same were elected by ballot:

President . .	Dr. David W. Cheever, of Boston.
Vice President . .	Dr. C. Ellery Stedman, of Dorchester.
Treasurer . .	Dr. Frank W. Draper, of Boston.
Corresponding Secret'y	Dr. Charles W. Swan, of Boston.
Recording Secretary .	Dr. Francis W. Goss, of Roxbury.
Librarian . .	Dr. Edwin H. Brigham, of Boston.

Dr. James C. White, of Boston, was chosen Orator, and

Dr. Joseph Stedman, of Jamaica Plain, Anniversary Chairman, for the Annual Meeting of the Society in 1890.

Voted,—That the next Annual Meeting of the Society be held in Boston, on the second Wednesday in June, 1890.

On nomination by the President, the following Standing Committees were appointed:

Of Arrangements.

O. K. Newell, F. B. Harrington, R. W. Lovett,
V. Y. Bowditch, H. L. Burrell, J. Homans, 2d.

On Publications.

G. C. Shattuck, R. M. Hodges, B. E. Cotting.

On Membership and Finances.

F. Minot, B. S. Shaw, J. Stedman,
E. G. Cutler, L. R. Stone.

To Procure Scientific Papers.

H. P. Walcott, E. H. Bradford, W. L. Richardson,
C. W. Cooper, S. B. Woodward, L. Wheeler.

On Ethics and Discipline.

G. J. Townsend, G. E. Francis, A. H. Johnson,
C. Howe, F. C. Shattuck.

On Medical Diplomas.

A. H. Cowdrey, E. J. Forster, F. S. Watson.

On motion of Dr. B. Cushing it was voted that a committee of five be appointed, who shall report at the next meeting whether any changes are needed in the laws relating to the Commitment of the Insane.

The following were appointed to constitute the committee:

B. Cushing, C. F. Folsom, J. Crowell, H. Derby, F. W. Page.

Adjourned at 8.15, P.M.

FRANCIS W. GOSS,
Recording Secretary.

Massachusetts Medical Society.

PROCEEDINGS OF THE SOCIETY.

ANNUAL MEETING.

First Day.

Sectional meetings of the Society were held in the Building of the Massachusetts Charitable Mechanic Association, Boston, on Tuesday, June 11, 1889, at 2 o'clock, P.M.

The Sections were organized and papers were presented as follows:

SECTION IN MEDICINE.

Dr. T. H. GAGE, of Worcester, . . Chairman.
Dr. J. A. JEFFRIES, of Boston, . . Secretary.

Antipyretics.—By Dr. E. N. Whittier, of Boston. Discussion by Drs. F. C. Shattuck, F. H. Williams, W. A. Morrison, J. R. Bronson, J. O. Whitney, J. W. Goodell.

Malarial Fever in Massachusetts.—By Dr. C. H. Cook, of Natick. Discussion by Drs. S. W. Abbott, J. F. A. Adams, J. O. Whitney, J. R. Bronson, W. E. Smith.

SECTION IN SURGERY.

Dr. D. W. CHEEVER, of Boston, . . Chairman.
Dr. M. D. CLARKE, of Haverhill, . . Secretary.

Aseptic and Antiseptic Surgery.—By Dr. H. L. Burrell, of Boston. Discussion by Drs. F. K. Paddock, S. W. Torrey, J. C. Warren, A. T. Cabot, O. H. Everett, G. De N. Hough, G. Jewett.

SECTION IN OBSTETRICS AND GYNECOLOGY.

Dr. A. D. SINCLAIR, of Boston, . . Chairman.
Dr. A. WORCESTER, of Waltham, . Secretary.

ASEPTIC OBSTETRICS.—By Dr. W. E. Boardman, of Boston. Discussion by Drs. F. E. Porter, S. M. Crawford, E. M. Buckingham, O. H. Everett, C. W. Stevens, Z. B. Adams, E. F. Dunbar, H. E. Marion, J. F. Couch, J. S. Greene, C. M. Green.

THE THIRD STAGE OF LABOR.—By Dr. J. B. Swift, of Boston. Discussion by Drs. C. M. Green, J. P. Reynolds, A. D. Sinclair, E. Reynolds.

THE SURGICAL TREATMENT OF BACKWARD DISPLACEMENTS OF THE UTERUS.—By Dr. C. P. Strong, of Boston. Discussion by Drs. F. H. Davenport, E. W. Cushing, F. C. Burt.

THE NON-RADICAL TREATMENT OF CANCER OF UTERUS AND VAGINA.—By Dr. H. C. Baldwin, of Boston.

FRANCIS W. GOSS,
Recording Secretary.

SECOND DAY.

The Society met in Mechanics' Hall, Boston, on Wednesday, June 12, 1889, at 9 o'clock, A.M., for the exercises of the one hundred and eighth Anniversary.

The President, Dr. DAVID W. CHEEVER, in the chair.

The record of the last annual meeting was read and accepted.

The Secretary read the names of Fellows admitted since the last annual meeting, and of Fellows whose deaths had been reported.

Fellows Admitted since June 12, 1888.

1888	Allen, Myra Daniel - - -	Tewksbury.
1888	Anthony, Francis Wayland - -	Bradford.
1889	Betts, Helen Loretta - - -	Jamaica Plain.
1888	Blake, Harrison Gray - - -	Woburn.
1889	Bridgham, Charles Burr - -	Cohasset.
1889	Brown, Henry Wilson - - -	Saundersville.
1888	Brown, Wilfred Gardner - -	Duxbury.
1888	Brownrigg, John Sylvester - -	Roxbury.
1888	Bussiere, Louis Clovis - - -	Montreal, Can.
1888	Carroll, Thomas Francis - -	Newton.

1888	Chadbourne, Arthur Patterson -	Boston.
1888	Chandler, Norman Fitch - -	Medford.
1888	Clark, Horace - - - -	Boston.
1888	Clark, Leonard Brown - - -	Worcester.
1889	Collins, Orville William - -	South Framingham.
1889	Craigin, George Arthur - -	Boston.
1888	Cummings, Mott Alvah - - -	Winchester.
1889	Donahue, Hugh - - - -	Boston.
1888	Drummey, Nicholas Daniel - -	Dorchester.
1888	Ensworth, William Howard - -	East Boston.
1888	Everett, Theodore - - -	Haverhill.
1888	Fay, William Eastman - - -	Boston.
1888	Finney, John Miller Turpin - -	Boston.
1888	Fisk, Arthur Lyman - - -	Boston.
1889	Foley, Walter James Paul - -	Roxbury.
1888	Gillard, Arthur Earnest - -	Lowell.
1888	Goldthwait, Joel Ernest - -	Boston.
1888	Greenwood, Allen - - -	Boston.
1889	Gulick, Luther Halsey - - -	Springfield.
1888	Hare, Charles Henry - - -	Boston.
1889	Harrington, Thomas Francis - -	Lowell.
1889	Hutchinson, Claribel Merrill - -	Waltham.
1889	Kennon, Charles Edward de Vere -	Roxbury.
1888	King, Nathaniel Clark - - -	Campello.
1888	Koyle, Frank Harcourt - - -	Lowell.
1888	Lawler, William Patrick - -	Lowell.
1888	Louis, Isaac - - - - -	Boston.
1889	Lincoln, Jacob Read - - -	Millbury.
1888	Mahoney, Stephen Andrew - -	Gloucester.
1889	Mayberry, Edwin Nelson - -	South Weymouth.
1889	Mayberry, Frank Eugene - -	Ashland.
1888	Miller, William Snow - - -	Worcester.
1888	Mowe, Frank Henry - - -	Leominster.
1889	Murphy, Daniel Francis - -	Woburn.
1888	O'Connor, Thomas Henry - -	Clinton.
1889	Peirson, Edward Lawrence - -	Salem.
1889	Peterson, Reuben - - - -	Boston.
1888	Potter, William Gage - - -	New Bedford.
1888	Richardson, Benjamin Franklin -	Lynn.
1888	Rogers, Alice - - - -	Taunton.
1888	Robinson, Lucy Morton - -	Brockton.
1889	Sargent, George Amory - -	Boston.
1888	Sayles, Joseph Borland - - -	Providence, R. I.
1889	Stearns, Daniel Waldo - - -	Newton.
1888	Stewart, Ferdinand Augustus -	Nashville, Tenn.
1888	Storer, Malcolm - - - -	Boston.
1889	Sullivan, William Joseph - -	Lawrence.

1889	Sweetsir, Frederick Ellsworth	Merrimac.
1888	Taylor, George Jubal	Newton L. Falls.
1888	Thompson, Fred	Salem.
1888	Wardwell, William Tecumseh Sherman	Roslindale.
1889	Welch, Edward Augustus	Worcester.
1888	Wilmarth, Frederick Augustus	Upton.
1888	Winn, Charles Henry	Winchester.
1889	Wood, Norman Perkins	Northfield.

Total, 65.

List of Deceased Fellows.

Admitted.	Name.	Residence.	Date of Death.	Age.
1842	Allen, Nathan	Lowell	Jan. 1, 1889	75
1843	Babcock, Aaron Gardner	Lexington	Aug. 6, 1888	85
1846	Barrett, Henry Augustus	Concord	April 6, 1889	70
1839	Bartlett, Francis Dana	So. Dartmouth	Nov. 11, 1888	85
1847	Bennett, Alonzo White	Uxbridge	July 19, 1888	67
1854	Breck, William Gilman	Springfield	Jan. 22, 1889	70
1878	Bullard, Edwin Charles	Dorchester	April 12. 1889	48
1887	Cochrane, John	Lowell	Sept. 9, 1888	40
1881	[1]Donders, Franz Cornelius	Utrecht, Holland	March 24, 1889	70
1866	Fay, George Wyman	East Weymouth	Feb. 5, 1889	55
1846	Folts, Daniel V	East Boston	May 28, 1889	73
1860	Fuller, Henry Holton	Charlestown	Dec. 13, 1888	52
1887	Gleeson, William Joseph	Boston	Dec. 7, 1888	22
1847	Harlow, James Frederick	Quincy Point	March 8, 1889	69
1884	Harriman, Herbert James	Revere	April 14, 1889	31
1837	Hubbard, George	Boston	March 19, 1889	80
1856	Hurd, Yorick Gordon	Ipswich	Sept. 24, 1888	61
1885	Jordan, Herbert Stanton	Waltham	Jan. 10, 1889	30
1877	Kendrick, Ford	Saundersville	Oct. 6, 1888	37
1861	Kittredge, Frank Rufus Caleb	Waltham	July 13, 1888	59
1886	Klinghammer, William Jerome	Roxbury	Oct. 1, 1888	31
1845	Kneeland, Samuel	Boston	Sept. 27, 1888	67
1851	Miller, John Leland	Sheffield	April 18, 1889	76
1853	Morton, Lloyd	Pawtucket, R. I.	Oct. 16, 1888	60
1856	Neilson, William	Salem	May 3, 1889	80
1867	O'Connor, James John	Holyoke	Dec. 14, 1888	46
1850	Orcutt, Almon Mitchel	Hardwick	Feb. 11, 1889	64
1843	Read, William	Boston	May 6, 1889	69
1854	Russell, Ira	Winchendon	Dec. 19, 1888	74
1840	Sargent, Joseph	Worcester	Oct. 13, 1888	73
1870	Shute, Charles Bailey	Malden	Nov. 25, 1888	45
1854	Smith, Abner Marshall	Pittsfield	May 23, 1889	68
1840	Stone, Henry Osgood	Salem	Aug. 23, 1888	67
1857	Swasey, Charles Lamson	New Bedford	Dec. 24, 1888	73
1849	Taylor, John Bunker	East Cambridge	Feb. 15, 1889	67
1877	Townshend, George Drew	Roxbury	Aug. 20, 1888	47
1887	Tracy, William James	Westfield	Oct. 3, 1888	30
1887	Tuck, Lorenzo Wadsworth	Boston	Oct. 19, 1888	28
1855	Winsor, Frederick	Winchester	Feb. 25, 1889	59

[1] Honorary. Total, 39.

The Treasurer, Dr. Draper, presented his annual report.

The following papers were read :

On Pain in the Small of the Back and Hips.—By Dr. J. A. Jeffries, of Boston. Discussion by Drs. P. C. Knapp and J. O. Whitney.

The Treatment of Malignant Disease by Escharotics.—By Dr. J. C. Munro, of Boston. Discussion by Dr. George Jewett.

Modern Methods in Teaching Clinical Obstetrics.—By Dr. Edward Reynolds, of Boston. Discussed by Drs. T. H. Gage, J. O. Whitney, J. P. Reynolds, B. E. Cotting, Z. B. Adams, J. P. Maynard, A. P. Weeks and C. H. Cook.

Dr. W. Everett Smith, appointed by the Society at its last meeting to make researches regarding the distribution of disease through the State, appealed to the members to aid him in his investigations.

The following delegates from other Societies were present at the meetings :

New Hampshire.—Drs. D. W. Currier, W. W. Wilkins.
Rhode Island.—Drs. C. M. Godding, F. M. Eaton.
Connecticut.—Dr. F. B. Look.
New York State Med. Association.—Dr. H. M. Fenno.

Drs. Currier, Wilkins and Godding presented the greetings of their Societies.

At 12 o'clock the Annual Discourse was delivered by Dr. Henry P. Walcott, of Cambridge.

At the close of the oration a vote of thanks was presented to the orator for the pleasure and satisfaction afforded by his admirable address.

At 1, p.m., the Annual Dinner, presided over by the Anniversary Chairman, Dr. James R. Chadwick, was served to more than seven hundred Fellows and invited guests.

FRANCIS W. GOSS,
Recording Secretary.

TREASURER'S REPORT.

THE Treasurer respectfully reports as follows concerning the Society's finances during the year ending April 15, 1889.

Balance from last account	$2515 71
Receipts from all other sources during year	9278 59
	11794 30
Expenses	8492 59
Balance to new account	$3301 71

The receipts and disbursements are set forth in detail in the accompanying accounts.

The Society's invested funds have remained unchanged since the last report; they amount to $33,420.17, distributed as follows:

Shattuck Fund	$9166 87
General Fund	11253 30
Phillips Fund	10000 00
Cotting Fund	3000 00

During the past year these funds yielded an income of $1,296.79.

Since April 15, 1888, assessment-dues to the amount of one hundred and forty-four dollars have been remitted by vote of the Councillors, upon the recommendation of the Committee on Membership and Finances.

By vote of the Councillors, also, seven members have lost their place on the Roll of Fellows by removal from Massachusetts and neglect of their assessment-obligations; and the name of one member has been dropped, in accordance with the By-Laws, because of five years' unexcused delinquency in the payment of his dues.

Four Fellows have resigned their membership during the year, and two others have been re-instated.

The Society bears upon its Rolls the names of 1765 Fellows.

Respectfully submitted,

F. W. DRAPER,

BOSTON, May 15, 1889. *Treasurer.*

DR. **F. W. Draper, Treasurer, in account with**

INCOME.

Balance from last account			$2515 71
Assessments paid to the Treasurer			1616 00
Assessments collected by District Treasurers:—			
	Barnstable	$110 00	
	Berkshire	175 00	
	Bristol North	160 00	
	Bristol South	225 00	
	Essex North	335 00	
	Essex South	385 00	
	Franklin	125 00	
	Hampden	280 00	
	Hampshire	195 00	
	Middlesex East	145 00	
	Middlesex North	390 00	
	Middlesex South	755 00	
	Norfolk	665 00	
	Norfolk South	110 00	
	Plymouth	135 00	
	Suffolk	1370 00	
	Worcester	570 00	
	Worcester North	135 00	
			6265 00
Interest account:—			
	General Fund	450 12	
	Phillips Fund	400 00	
	Shattuck Fund	366 67	
	Cotting Fund	80 00	
	Interest on cash-balance in Savings Banks	96 30	
			1393 09
Extra Dinner Tickets sold June 12, 1888			4 50
			$11794 30

The Committee appointed at the February meeting to audit the Treasurer's accounts, have carefully attended to their duty, and respectfully report that they find the accounts properly vouched and correctly cast.

The balance on hand is $3,301.71.

The invested funds correspond with the schedule exhibited, and amount to $33,420.17.

S. J. MIXTER, } *Auditing*
J. S. GREENE, } *Committee.*

BOSTON, May 15, 1889.

the Massachusetts Medical Society. Cr.

Expenses.

On account of Annual Meeting, 1888:—		
Carriage bill	$15 50	
Caterer	1345 20	
Cigars	75 00	
Exhibit expenses	7 45	
Flowers	300 00	
Incidentals	46 13	
Music	104 00	
Police service	24 00	
Printing	56 51	
		$1973 79
Committee on Diplomas, for printing and postage		11 65
Committee on Ethics and Discipline, mileage account		15 70
Committee on Publications:—		
Braithwaite's Retrospect	2485 00	
Communications and Transactions, 1888	519 07	
		3004 07
Councillors' Orders:—		
Lunches at Stated Meetings (Cotting fund),	105 00	
Binding Transactions received in exchange	4 60	
Printing and distributing Resolution concerning a National Board of Health	11 05	
		120 65
District Societies' Account:—		
Censors-at-large, for advertising, etc.	49 92	
Censors' fees for examining candidates for Fellowship	264 00	
Dividend for 1888	1257 85	
District Treasurers' fees and expenses for collections	353 23	
		$1925 00
Librarian's Expenses:—		
Allowance for Clerk	50 00	
Postage and express charges	385 00	
		435 00
Recording Secretary's Expenses:—		
Printing and postage	104 63	
Salary	250 00	
Stationery	8 75	
Incidentals	4 88	
		368 26
Rent to January 1, 1889		150 00
Treasurer's Expenses:—		
Incidentals	12 10	
Printing and postage	69 37	
Salary	400 00	
Stationery	7 00	
		488 47
		8492 59
Balance to new account, April 15, 1889		3301 71
		$11794 30

Officers of the Massachusetts Medical Society.

1889—1890.

Chosen June 11, 1889.

DAVID W. CHEEVER,	Boston,	President.
C. ELLERY STEDMAN,	Dorchester,	Vice-President.
FRANK W. DRAPER,	Boston,	Treasurer.
CHARLES W. SWAN,	Boston,	Cor. Secretary.
FRANCIS W. GOSS,	Roxbury,	Rec. Secretary.
EDWIN H. BRIGHAM,	Boston,	Librarian.
JAMES C. WHITE,	Boston,	Orator.
JOSEPH STEDMAN,	Jamaica Plain,	Anniv. Chairman.

Standing Committees.

Of Arrangements.

O. K. Newell, F. B. Harrington, R. W. Lovett, V. Y. Bowditch, H. L. Burrell, J. Homans, 2d.

On Publications.

G. C. Shattuck, R. M. Hodges, B. E. Cotting.

On Membership and Finances.

F. Minot, B. S. Shaw, J. Stedman, E. G. Cutler, L. R. Stone.

To Procure Scientific Papers.

H. P. Walcott, E. H. Bradford, W. L. Richardson, C. W. Cooper, S. B. Woodward, L. Wheeler.

On Ethics and Discipline.

G. J. Townsend, G. E. Francis, A. H. Johnson, C. Howe, F. C. Shattuck.

On Medical Diplomas.

A. H. Cowdrey, E. J. Forster, F. S. Watson.

Presidents of District Societies—Vice-Presidents (Ex-Officiis).

(Arranged according to Seniority.)

S. D. Brooks,	G. W. Gay,
J. H. Gilbert,	B. H. Hartwell,
L. R. Stone,	C. W. Burton,
J. M. Rice,	C. A. Lovejoy,
W. Dwight,	H. J. Smith,
J. Stedman,	W. S. Robinson,
J. B. Brewster,	F. W. Graves,
G. S. Eddy,	S. T. Davis,
C. G. Carleton,	C. G. Trow.

Councillors.

Barnstable.—Drs. C. M. Hulbert, South Dennis; A. H. Newton, Provincetown; F. A. Rogers, Brewster.

Berkshire.—Drs. H. Bushnell, North Adams; G. S. Hatch, Cheshire; F. K. Paddock, Pittsfield; S. H. Parks, Great Barrington; G. H. Race, West Stockbridge; F. P. Whittlesey, Great Barrington.

Bristol North.—Drs. A. S. Deane, E. F. Galligan, F. A. Hubbard, Taunton; G. Mackie, Attleboro'; S. D. Presbrey, Taunton.

Bristol South.—Drs. E. P. Abbé, New Bedford; S. W. Bowen, Fall River; W. Butler, Vineyard Haven; D. E. Cone, Fall River; G. L. Ellis, Middleboro'; J. H. Jackson, Fall River; W. H. Taylor, New Bedford.

Essex North.—Drs. J. Crowell, Haverhill; C. N. Chamberlain, Lawrence; F. A. Howe, Newburyport; O. H. Johnson, Haverhill; G. Montgomery, Newburyport; J. Pierce, Methuen; R. B. Root, Georgetown; F. E. Weil, North Andover; L. J. Young, Haverhill.

Essex South.—Drs. D. Choate, Salem; H. Colman, Lynn; P. Eveleth, Marblehead; I. F. Galloupe, Lynn; J. E. Garland, Gloucester; F. E. Hines, Salem; E. A. Kemp, Danvers; T. Kittredge, Salem; G. S. Osborne, C. C. Pike, Peabody; C. C. Sheldon, Lynn; A. M. Tupper, Rockport.

Franklin.—Drs. A. C. Deane, A. C. Walker, Greenfield; W. M. Wright, Orange.

Hampden.—Drs. G. W. Davis, Holyoke; W. H. Deane, Blandford; J. W. Hannum, Ludlow; E. E. Maryott, Springfield; F. F. Parker, Chicopee; S. F. Pomeroy, A. R. Rice, Springfield; A. F. Tracy, Westfield.

HAMPSHIRE.—Drs. C. M. Barton, Hatfield; J. Dunlap, C. R. Gardner, W. M. Trow, Northampton; F. Tuckerman, Amherst.

MIDDLESEX EAST.—Drs. F. F. Brown, Reading; A. H. Cowdrey, Stoneham; J. M. Harlow, S. W. Kelley, Woburn.

MIDDLESEX NORTH.—Drs. F. W. Chadbourne, J. J. Colton, Lowell; N. B. Edwards, North Chelmsford; C. I. Fisher, Tewksbury; J. H. Gilman, Lowell; W. F. Heald, Pepperell; J. C. Irish, W. H. Lathrop, A. W. Lavigne, C. A. Savory, Lowell.

MIDDLESEX SOUTH.—Drs. Z. B. Adams, Framingham; C. H. Cook, Natick; T. Crozier, Charlestown; S. W. Driver, Cambridge; D. M. Edgerly, Cambridgeport; E. J. Forster, Charlestown; R. L. Hodgdon, Arlington; H. Holmes, Lexington; A. F. Holt, Cambridgeport; A. Hosmer, Watertown; C. J. McCormick, Waltham; A. Nott, West Newton; G. A. Oviatt, South Sudbury; W. A. Phipps, Hopkinton; G. C. Pierce, Ashland; F. E. Porter, Auburndale; J. L. Sullivan, Malden; G. J. Townsend, South Natick; C. E. Vaughan, H. P. Walcott, Cambridge; A. C. Webber, W. W. Wellington, Cambridgeport; J. W. Willis, Waltham; M. Wyman, Cambridge.

NORFOLK.—Drs. C. A. Bemis, West Medway; H. W. Broughton, Jamaica Plain; J. W. Chase, Dedham; G. W. Clement, B. E. Cotting, Roxbury; B. Cushing, Dorchester; E. F. Dunbar, Roxbury; H. C. Ernst, Jamaica Plain; W. S. Everett, Hyde Park; W. C. B. Fifield, Dorchester; J. A. Finn, Roxbury; D. S. Fogg, Norwood; E. P. Gerry, Jamaica Plain; H. P. Jaques, Milton; A. D. Kingsbury, Needham; G. K. Sabine, Brookline; H. R. Stedman, Roslindale; C. F. Withington, Roxbury.

NORFOLK SOUTH.—Drs. S. M. Donovan, Quincy; J. C. Fraser, East Weymouth; G. W. Tinkham, Weymouth.

PLYMOUTH.—Drs. J. H. Averill, Campello; H. F. Borden, Brockton; H. W. Dudley, Abington; J. C. Gleason, Rockland; B. F. Hastings, Whitman; A. E. Paine, Brockton.

SUFFOLK.—Drs. S. L. Abbot, J. Ayer, H. J. Barnes, C. J. Blake, H. I. Bowditch, E. H. Bradford, F. E. Bundy, J. F. Bush, A. T. Cabot, J. R. Chadwick, D. W. Cheever. *President*, J. W. Cushing, O. W. Doe, F. W. Draper, *Treasurer*, S. H. Durgin, T. Dwight, Boston; T. W. Fisher, South Boston; R. H. Fitz, C. F. Folsom, Boston; M. F. Gavin, South Boston; J. O. Green, F. B. Greenough, W. H. H. Hastings, W. C. Holyoke, J. Homans, W. Ingalls, B. J. Jeffries, G. F. Jelly, F. I. Knight, G. H. Lyman, A. L. Mason, A. E. McDonald, F. Minot, C. B. Porter, A. Post, J. P. Reynolds, W. L. Richardson, T. M. Rotch, G. B. Shattuck, G. C. Shattuck, B. S. Shaw, A. D. Sinclair, A. M.

Sumner, C. W. Swan, *Corresponding Secretary*, G. G. Tarbell, O. F. Wadsworth, J. C. Warren, Boston; A. P. Weeks, Chelsea; J. C. White, E. N. Whittier, E. Wigglesworth, H. W. Williams, Boston.

WORCESTER.—Drs. A. D. Blodgett, West Brookfield; G. Brown, Barre; W. Davis, G. E. Francis, T. H. Gage, Worcester; E. B. Harvey, Westboro'; W. H. Lincoln, Millbury; J. O. Marble, Worcester; G. M. Morse, Clinton; J. G. Park, J. M. Rice, Worcester; W. E. Rice, North Grafton; G. C. Webber, Millbury; E. Warner, L. Wheeler, A. Wood, Worcester.

WORCESTER NORTH.—Drs. R. F. Andrews, Gardner; G. D. Colony, Fitchburg; J. R. Greenleaf, Gardner; G. Jewett, Fitchburg; J. P. Lynde, Athol.

Censors.

BARNSTABLE.—Drs. G. W. Doane, E. E. Hawes, Hyannis; H. S. Kelley, Jr., Dennisport; G. N. Munsell, Harwich; J. E. Pratt, Sandwich.

BERKSHIRE.—Drs. J. F. A. Adams, S. C. Burton, Pittsfield; E. E. Mather, Williamstown; J. H. A. Matte, North Adams; A. T. Wakefield, Sheffield.

BRISTOL NORTH.—Drs. O. Copp, W. Y. Fox, Taunton; J. B. Gerould, North Attleboro'; M. Perry, Taunton; A. M. Round, Norton.

BRISTOL SOUTH.—Drs. W. A. Dolan, Fall River; C. A. Gould, Central Village; W. T. Learned, Fall River; F. M. Sherman, New Bedford; E. M. Whitney, Fair Haven.

ESSEX NORTH.—Drs. H. F. Adams, Newburyport; J. F. Croston, Haverhill; R. C. Huse, Georgetown; F. W. Kennedy, Lawrence; J. F. Young, Newburyport.

ESSEX SOUTH.—Drs. F. S. Atwood, Salem; W. W. Eaton, Danvers; H. K. Foster, Peabody; C. W. Galloupe, Lynn; C. W. Haddock, Beverly.

FRANKLIN.—Drs. E. G. Best, Turner's Falls; C. Bowker, Bernardston; F. J. Canedy, Shelburne Falls; J. B. Laidley, Conway; G. P. Twitchell, Greenfield.

HAMPDEN.—Drs. W. H. Chapin, F. W. Ellis, Springfield; L. J. Gibbs, Chicopee Falls; W. H. Pomeroy, G. L. Woods, Springfield.

HAMPSHIRE.—Drs. J. M. Fay, Northampton; D. B. N. Fish, Amherst; A. H. Hoadley, Northampton; H. H. Seelye, Amherst; G. D. Thayer, Northampton.

MIDDLESEX EAST.—Drs. W. S. Brown, Stoneham; E. S. Jack, Melrose; D. March, Jr., Winchester; C. E. Prior, Melrose; P. Sheldon, Wakefield.

MIDDLESEX NORTH.—Drs. B. R. Benner, G. J. Bradt, H. P. Jefferson, H. S. Johnson, J. J. McCarty, Lowell.

MIDDLESEX SOUTH.—Drs. C. K. Cutter, Charlestown; E. Farnham, Cambridge; H. E. Marion, Brighton; F. W. Taylor, North Cambridge; A. Worcester, Waltham.

NORFOLK.—Drs. H. L. Harrington, Dorchester; A. P. Perry, Jamaica Plain; I. W. Starbird, J. A. Tanner, Dorchester; F. W. Vogel, Roxbury.

NORFOLK SOUTH.—Drs. S. C. Bridgham, South Braintree; C. A. Dorr, South Hingham; W. A. Drake, North Weymouth; F. C. Granger, Randolph; C. C. Tower, South Weymouth.

PLYMOUTH.—Drs. J. E. Bacon, E. A. Chase, Brockton; A. A. MacKeen, Whitman; F. J. Ripley, Brockton; F. G. Wheatley, North Abington.

SUFFOLK.—Drs. H. L. Burrell, F. H. Davenport, G. M. Garland, C. M. Green, J. H. McCollom, Boston.

WORCESTER.—Drs. W. P. Bowers, Clinton; O. H. Everett, H. S. Knight, W. C. Stevens, Worcester; G. C. Webber, Millbury.

WORCESTER NORTH.—Drs. C. H. Bailey, South Gardner; C. E. Bigelow, E. J. Cutter, Leominster; E. L. Fiske, H. H. Lyons, Fitchburg.

Commissioners of Trials.

BARNSTABLE	B. D. Gifford	Chatham.
BERKSHIRE		
BRISTOL NORTH	M. C. Golden	Taunton.
BRISTOL SOUTH	J. H. Mackie	New Bedford.
ESSEX NORTH	F. A. Howe	Newburyport.
ESSEX SOUTH	A. H. Johnson	Salem.
FRANKLIN	E. C. Coy	Montague City.
HAMPDEN	E. G. Ufford	Agawam.
HAMPSHIRE	J. Yale	Ware.
MIDDLESEX EAST	S. W. Abbott	Wakefield.
MIDDLESEX NORTH	W. M. Hoar	Lowell.
MIDDLESEX SOUTH	G. C. Pierce	Ashland.
NORFOLK	C. C. Hayes	Hyde Park.
NORFOLK SOUTH	J. A. Gordon	Quincy.
PLYMOUTH	H. N. Jones	Kingston.
SUFFOLK	C. W. Swan	Boston.
WORCESTER	J. Wilmarth	Milford.
WORCESTER NORTH	F. H. Thompson	Fitchburg.

Officers of the District Medical Societies.

BARNSTABLE.—Dr. S. T. Davis, Orleans, *President;* Dr. S. Pitcher, Hyannis, *Vice-President;* Dr. F. A. Rogers, Brewster, *Secretary;* Dr. C. M. Hulbert, South Dennis, *Treasurer.*

BERKSHIRE.—Dr. C. W. Burton, Adams, *President;* Dr. W. P. Small, Great Barrington, *Vice-President;* Dr. H. Colt, Pittsfield, *Secretary;* Dr. W. L. Paddock, Pittsfield, *Treasurer;* Dr. W. W. Leavitt, Pittsfield, *Librarian.*

BRISTOL NORTH.—Dr. W. S. Robinson, Taunton, *President;* Dr. F. A. Hubbard, Taunton, *Vice-President;* Dr. F. Mansfield, Taunton, *Secretary;* Dr. J. B. Murphy, Taunton, *Treasurer;* Dr. F. A. Hubbard, Taunton, *Librarian.*

BRISTOL SOUTH.—Dr. G. S. Eddy, Fall River, *President;* Dr. S. W. Hayes, New Bedford, *Vice-President;* Dr. A. J. Abbé, Fall River, *Secretary, Treasurer and Librarian.*

ESSEX NORTH.—Dr. C. G. Carleton, Lawrence, *President;* Dr. G. W. Snow, Newburyport, *Vice-President;* Dr. M. D. Clarke, Haverhill, *Secretary and Treasurer.*

ESSEX SOUTH.—Dr. C. A. Lovejoy, Lynn, *President;* Dr. D. Coggin, Salem, *Vice-President;* Dr. H. W. Newhall, Lynn, *Secretary;* Dr. T. L. Perkins, Salem, *Treasurer;* Dr. E. L. Peirson, Salem, *Librarian.*

FRANKLIN.—Dr. C. G. Trow, Sunderland, *President;* Dr. W. H. Pierce, Bernardston, *Vice-President;* Dr. F. H. Zabriskie, Greenfield, *Secretary and Treasurer.*

HAMPDEN.—Dr. S. D. Brooks, Springfield, *President;* Dr. F. W. Chapin, Springfield, *Vice-President;* Dr. J. T. Herrick, Springfield, *Secretary, Treasurer and Librarian.*

HAMPSHIRE.—Dr. W. Dwight, North Amherst, *President;* Dr. G. F. Thomson, Belchertown, *Vice-President;* Dr. A. H. Hoadley, Northampton, *Secretary;* Dr. C. W. Cooper, Northampton, *Treasurer;* Dr. G. D. Thayer, Northampton, *Librarian.*

MIDDLESEX EAST.—Dr. F. W. Graves, Woburn, *President;* Dr. J. S. Clark, Melrose, *Vice-President;* Dr. D. March, Jr., Winchester, *Secretary;* Dr. J. O. Dow, Reading, *Treasurer.*

MIDDLESEX NORTH.—Dr. H. J. Smith, Lowell, *President;* Dr. C. M. Fisk, Lowell, *Vice-President;* Dr. W. G. Eaton, Lowell, *Secretary;* Dr. W. B. Jackson, Lowell, *Treasurer;* Dr. C. A. Viles, Lowell, *Librarian.*

MIDDLESEX SOUTH.—Dr. L. R. Stone, Newton, *President;* Dr. Dr. J. T. G. Nichols, Cambridge, *Vice-President;* Dr. J. A. Mead,

Watertown, *Secretary;* Dr. W. Ela, Cambridge, *Treasurer;* Dr. S. E. Wyman, Cambridge, *Librarian.*

NORFOLK.—Dr. J. Stedman, Jamaica Plain, *President;* Dr. J. Seaverns, Roxbury, *Vice-President;* Dr. S. A. Potter, Roxbury, *Secretary and Librarian;* Dr. E. G. Morse, Roxbury, *Treasurer.*

NORFOLK SOUTH.—Dr. J. H. Gilbert, Quincy, *President;* Dr. J. W. Spooner, Hingham, *Vice-President;* Dr. J. F. Welch, Quincy, *Secretary and Treasurer;* Dr. S. C. Bridgham, South Braintree, *Librarian.*

PLYMOUTH.—Dr. J. B. Brewster, Plymouth, *President;* Dr. A. E. Paine, Brockton, *Vice-President;* Dr. A. V. Lyon, Brockton, *Secretary and Treasurer;* Dr. W. P. Chisholm, Brockton, *Librarian.*

SUFFOLK.—Dr. G. W. Gay, Boston, *President;* Dr. E. N. Whittier, Boston, *Vice-President;* Dr. H. F. Vickery, Boston, *Secretary;* Dr. E. M. Buckingham, Boston, *Treasurer;* Dr. B. J. Jeffries, Boston, *Librarian.*

WORCESTER.—Dr. J. M. Rice, Worcester, *President;* Dr. G. Brown, Barre, *Vice-President;* Dr. W. C. Stevens, Worcester, *Secretary;* Dr. S. B. Woodward, Worcester, *Treasurer;* Dr. A. C. Getchell, Worcester, *Librarian.*

WORCESTER NORTH.—Dr. B. H. Hartwell, Ayer, *President;* Dr. A. L. Stickney, Ashburnham, *Vice-President;* Dr. A. P. Mason, Fitchburg, *Secretary;* Dr. E. P. Miller, Fitchburg, *Treasurer;* Dr. F. H. Thompson, Fitchburg, *Librarian.*

Medical Communications

OF THE

MASSACHUSETTS MEDICAL SOCIETY.

VOL. XIV.—N°. III.—1889.

CONTENTS.

ARTICLE XVI.—THE ANNUAL DISCOURSE:—State and Preventive Medicine in Massachusetts.
By HENRY P. WALCOTT, M.D., of Cambridge . 317

ARTICLE XVII.—Modern Methods in Teaching Clinical Obstetrics.
By EDWARD REYNOLDS, M.D., of Boston . . 379

ARTICLE XVIII.—Escharotics in the Treatment of Malignant Disease.
By JOHN C. MUNRO, M.D., of Boston . . . 401

ARTICLE XIX.—On Pain in the Small of the Back and Thighs.
By JOHN A. JEFFRIES, M.D., of Boston . . . 415

ARTICLE XX.—The Non-Radical Treatment of Cancer of the Uterus and Vagina.
By HENRY C. BALDWIN, M.D., of Boston. . . 431

ARTICLE XXI.—Aseptic Obstetrics.
By WILLIAM E. BOARDMAN, M.D., of Boston. . 443

ARTICLE XXII.—The Surgical Treatment of Backward Displacements of the Uterus.
By CHARLES P. STRONG, M.D., of Boston . . 471

ARTICLE XXIII.—Antipyretics.
By EDWARD N. WHITTIER, M.D., of Boston . . 493

ARTICLE XXIV.—A Study of Malarial Fever in Eastern Massachusetts.
By CHARLES H. COOK, M.D., of Natick . . 527

ARTICLE XXV.—Some Practical Experiments in Aseptic Surgery.
By HERBERT L. BURRELL, M.D., of Boston . . 551

PROCEEDINGS:
Of the Councillors 59
Of the Society 68
Treasurer's Report 73
Officers of the Society 76
Officers of the District Medical Societies 81

SIGILL. SOC. MED. MASSACHUSETTS. A.D. 1781.

BOSTON:
PRINTED BY DAVID CLAPP & SON.....115 HIGH ST.
1889.

NOTICE TO FELLOWS OF THE SOCIETY.

1. Braithwaite's Retrospect is issued to the Fellows of the Society semi-annually, in February and August, as soon as received from the publisher. The Medical Communications are issued as soon as practicable after the Annual Meeting.

2. The Publications are sent only to those who have paid their assessments, and to such Honorary and Retired Members as may annually apply for them.

3. The annual assessment should be paid in advance, either to the proper District Treasurer, or to the Treasurer of the Society, Dr. F. W. Draper, 304 Marlborough St., Boston.

4. Fellows who, having paid their assessments, fail to receive the Publications, should notify Dr. E. H. Brigham, the Librarian. He may be addressed at the Medical Library, 19 Boylston Place, Boston.

5. Fellows wishing to become Retired Members, should observe the requirements of By-Law V., as follows:—"Any Fellow who has arrived at the age of sixty-five years, has paid all his assessments, or has been excused from them, and has notified the Treasurer of the Society in writing, may, on recommendation of a Committee and by a vote of the Councillors, become a Retired Member."

6. Fellows are requested to send promptly to the Treasurer or Librarian notice of changes of residence.

7. The next Annual Meeting of the Society will be held in Boston, on the second Wednesday in June, 1890.

FRANCIS W. GOSS,
Recording Secretary.

Hotel Eliot, Roxbury, Mass.